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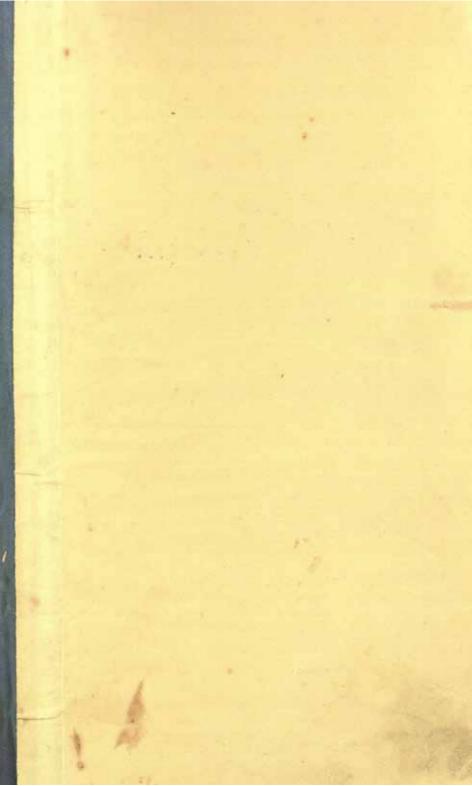
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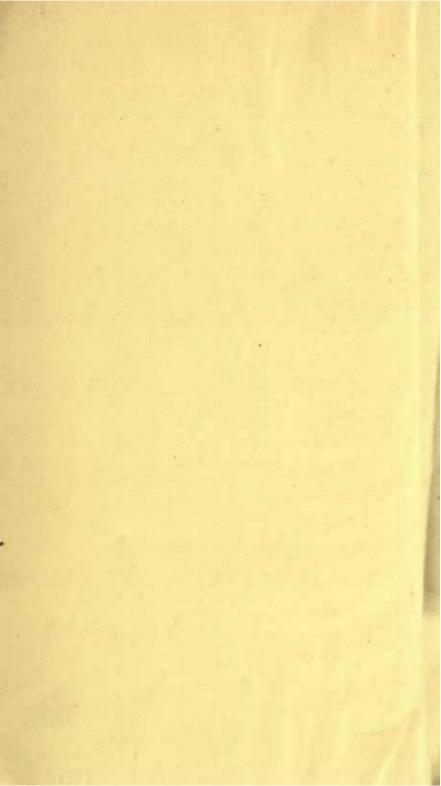
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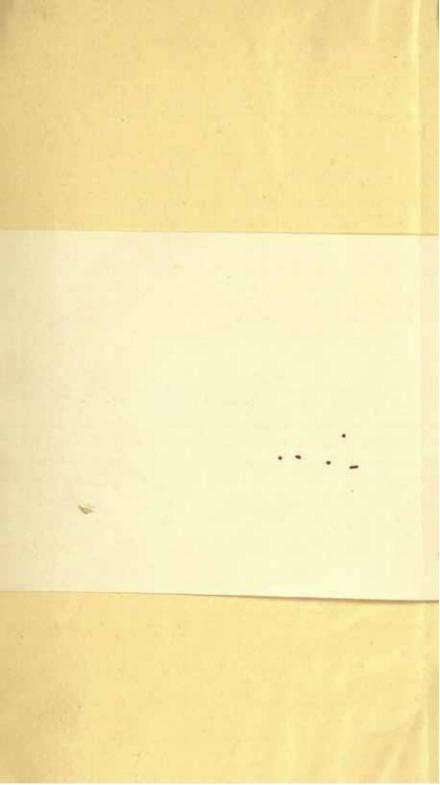
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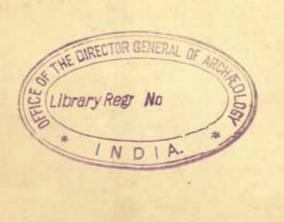


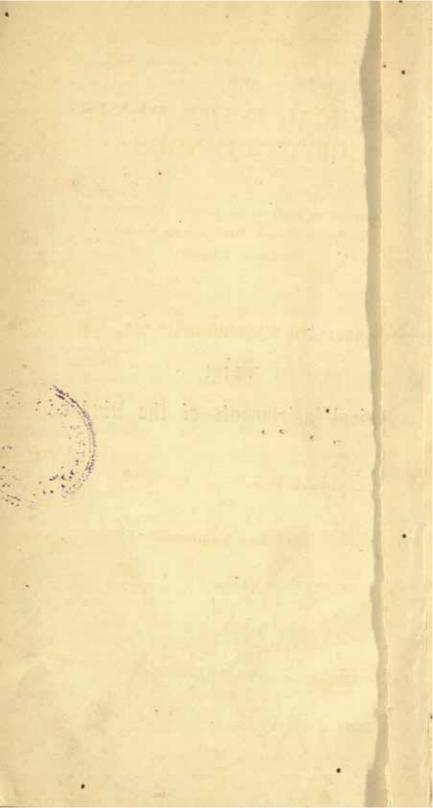
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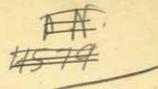
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Surgical Instruments of the Hindus





THE



SURGICAL INSTRUMENTS OF THE HINDUS

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A Comparative Study of the Surgical Instruments of the Greek, Roman, Arab and the Modern 30268 Eouropean Surgeons.

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GIRINDRANATH MUKHOPADHYAYA, B.A., M.D.

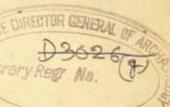
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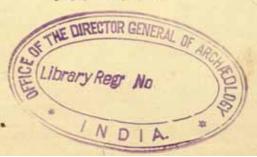
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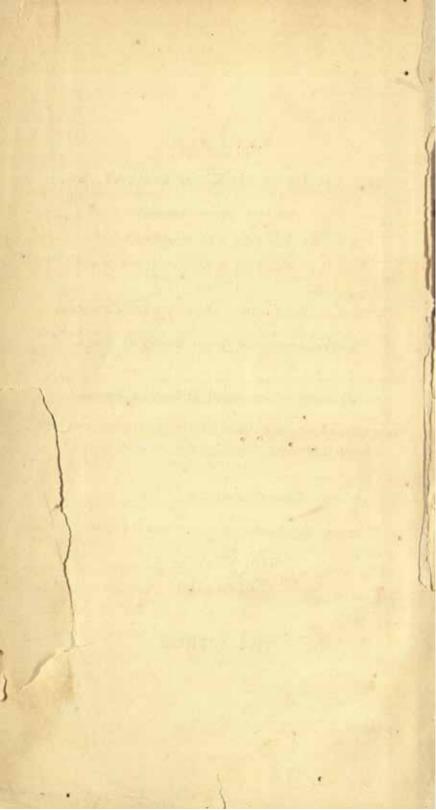
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DEDICATED

BY

THE AUTHOR





PREFACE.

For researches into the state of medicine among the Ancient Hindus, we have several sources of information to scrutinise. The remarks of Dr. Payne regarding the sources of information of Anglo-Saxon Medicine may apply here with still greater force.¹

First is the evidence of contemporary literature about the craft of physicians and surgeons, since we are sure that there has always been a class of medicine men of one kind or another. Thus we find in the Rgveda, the use of artificial limb as a substitute for a limb accidentaly lost². From the Mahābhārata,

श्वित्वं हि वैरिवाच्हेदि पर्यम् श्वाजा खेलस्य परितक्तायाम्। सर्यो जंड्यामायसी विश्वपलाये धने हिते सर्वव प्रत्यधनम्॥

Rgveda-15th Rk., 1st Mandala, 116 Sükta.

भगस्य प्रोहितः खेली नाम राजा तस्य सम्बन्धिनी विश्वपत्तानास्त्री, संगामे श्रमुभिः किन्नपदा भागीत्। प्रोहितेन भगस्येन स्तृती भन्नित्री स्वानी भागत्य भागीमयं पादं समधत्ताम्। तदेतदाइ 'भाजा'—भाजी, संगामे, भगस्य प्ररोहितस्य—खेलस्य राजतः सम्बन्धित्याः विश्वपत्तास्थाया, 'चरिसं'—चरणं, 'वरिसं'—वेः पिचणः, 'पण्' पतत्रम् इतः, 'भच्छेदि हि'—पूरा किन्नमस्त् खलु। हे भन्निती। द्वां भगस्येन स्तृती सन्ती, 'परितक्तायायं'—रावी, भागत्य, 'सदाः'—तदानीमेन, 'सर्चवे'—सर्च्' गन्तम् इत्यर्थः, विश्वपत्ताये 'भायस्त्री',—लीहमयीम्, 'जहां'—जहीपलचितं पादम्, 'प्रत्यधत्तम्'—स्थानम एकीकरणमित्यर्थः क्षत्वन्ती।

¹ Payne's English Medicine in the Anglo-Saxon Times, P. 7.

we learn that when Parikṣit, the king of the Kurus, became certain of his approaching death by snake-bite, due to a curse uttered by a sage, he tried to protect himself by the constant attendance of a number of physicians, who were well supplied with antidotes. Again it is stated that when the great warrior Bhīṣma was wounded in war, the skillful army surgeons came to him with the necessary medical and surgical appliances to treat his wounds. From the Mohāvāgga, we learn that Jīvaka, the personal physician of Buddha, practised cranial surgery with success. In the Mālavikāgnimitra, we find the use of charms—a signet

मंसन्त्र मिलिसियेव स तथा सन्ततः त्वित्। प्रासादं वार्यामास एकसभ्यं स्रचितं। रचाव विद्धे तब भियजयीयधानि च। ब्राह्मयासनस्त्वाय सर्वती वैन्यीजयत्।

Makabharata, Adi Parva, Ch. 42.

उपातिष्ठत्रधी वैद्याः श्रन्थीदरणकीविदाः। सर्व्योपकरणैर्युकाः कुञ्जलैः साधु श्रिचिताः। तान् दक्षा जान्दवीपुनः श्रीवाच तनयं तव। धनं दक्षा विस्त्रणनां पूजयिता चिकित्सकाः। एवं गते मर्थेदानौं वैद्यैः कार्य्योनहासि किं। चनुष्ठम्ये प्रश्ननां हि प्राप्तीऽक्षि प्रमां गति। नेष धन्यों महीपालाः श्ररतन्पगतस्य मे। एमिरेव श्ररेषाहं दम्बच्योऽक्षि नराधिपाः। तक्तुत्वा वचनं तस्य पुत्री दुर्व्योधनसव। वैद्यान् विसर्व्ययासास पूजयिता यथाऽर्हतः।

> Mahābhārata, Bhīsma Parva, Ch. 121, Vs. 5745—5750. (A.S.B. Ed.)

Mohävägga, VIII. 1.18.

ring as a healing talisman for the cure of snake-bite; and also we find there a reference to a class of physicians who specialised themselves in Toxicology (Viṣa-Vaidya), and were held in high esteem for their professional skill by the public. From the Bhojaprabandha, the administration of some kind of anæsthetic by inhalation before surgical operations can be ascertained. Similarly from the books of Law, we know the relations of the profession to society in general. In the Manusamhita, we have unmistakable testimony of the decline of Hindu surgery as the author prohibits the eating of cooked rice from the hands of a surgeon.

Mālavikāgnimitra, Ch. I.

क्य। - जिदु जिदु भरा। धुवसिती विखवेदी। उदकुभविधायोग सपमुह्था कपिदन्वा। ता अवेसीबदुत्ति। धारि। - एदं सपमुह्यम् बहुनीययम्। पक्ता सह हरवे यम्। Ibid, Ch. IV.

परि !— हैदी दंशस्य दाशी वा चतस्यारक्रमीचणम् । एतानि दष्टमावाणाः
 मायुष्याः प्रतिपत्तयः ॥ (संप्रति विषवैद्यानाम् कर्यः।)
 राजा ।— जयसेने । ध्रवसिद्धिः चिप्रमाहयताम् ॥

Ibid, Ch. IV.

निपु।—पसम्मुहवन्ति दीसदि। व्यवि व धुवसिहिन्ता चिद्रस्सिदी। मा से
 व्यस्त्वािक्यं पावं॥

Ibid, Ch. IV.

चिकित्सकान्देवलकान्मांसिकवियासया।
 विप्रश्चेन च जीवनी वर्जाः स्युईव्यकव्यवीः॥

Manusamhita, Ch. III, 152.

चिकित्सकस्य समयीः क्र्स्यीच्छिष्टभीजिनः। उदादं मृतिकादं च पर्याचान्तमनिदंशम्॥

मिंह ! देवीए इदं सिथिसकासादी वानीदवागमुद्दासवाइं बहुलीववं सिथिदं विभाववनी तृह चवालके पविदक्षि ॥

Secondly, monuments or inscriptions scattered about the country have to be searched, as references found therein to the science of medicine, are more trustworthy than documents which may have been more or less tampered with by interpolations of subsequent writers. Thus we learn from the Edicts of Asoka, that hospitals were established by him in different parts of his kingdom, not only for the treatment of suffering humanity but also for the brute creation.

Thirdly, personages and scenes in connection with medical practice, and figures of herbs may have been represented in works of art which must be thoroughly examined. But unfortunately we do not possess any such work of art and so we can learn nothing to our purpose from this source. In the interpretation of the subject of the Friezes of the Rani Naur and Ganesha's Cave, Dr. R. L. Mitra says,-"The shampooing in the Ganesa Cave may be for a parent, but the close seat with the right hand round the neck of the male personage in the other, would be highly unbecoming in an unmarried female. But if the stooping figure be taken to be that of a wounded man, a wounded priest for instance, the lady may be a maiden nursing . him without any offence to propriety. It is true that the appearance of the figure on the mattress does not indicate suffering from a wound, but in the Rani Naur frieze, the stooping head affords some indication of it."2

पूर्यं चिकित्सकस्थानं पुंचल्यास्वन्नमिन्द्रयम्। विटा वार्ष्यकस्थानं अस्तविक्रयिणी मलम्॥

Manusamhita, Ch. IV, 220.

¹ Rock Inscriptions, Edict II.

The Antiquities of Orissa, Vol. II, p. 11.

Fourthly, the various kinds of surgical instruments preserved in museums are to be examined and the reports of finds of surgical appliances in various localities are to be studied. We know what a flood of light has been thrown on ancient Greek surgery by the steady progress of archæological discovery and finds of instruments at Pompeii, Herculaneum and elsewhere, and by the study of the specimens preserved in the Naples museum, the Athens museum and other museums of Europe. But as far as I have been able to trace, our museums contain no finds supplying us with any information on the subject.

Fifthly, the literature of medicine itself should be thoroughly inquired into and excerpts elucidative of our subject should be compared with one another. "The detailed descriptions of the very numerous Hindu instruments not being very minute or precise, Professor Wilson says, we can only conjecture what they may have been, from a consideration of the purport of their names, and the objects to which they were applied, in connection with the imperfect description given." We are fortunate, however, in possessing a copious medical literature of great merit from very early times. We shall describe the important books in the introductory chapter, with short notices of their authors.

Sixthly, the comparative study of the science at the same period in other countries also furnishes us with valuable materials as regards the state of medicine in a country. It is well known that Sanskrit works are often written in a very terse language

Royle's Antiquity of Hindu Medicine, foot-note, p. 59-60.

and it might be said with greater truth about the works of early Sanskrit authors, the comment of a learned critic about the style of Thucydides, the famous historian,-"the most obvious and characteristic of his peculiarities is an endeavour to express as much matter as possible in as few words as possible, to combine many thoughts into one, and always to leave the reader to supply something of his own. Hence his conciseness often becomes obscure." I could not form any idea as to the shape of some of the surgical instruments from the descriptions given in the text books, and the commentators are often silent on those passages. But when I read the accounts of similar instruments in Greek and Roman literature, my difficulties at once cleared up. We know with what brilliant results comparative mythology and comparative philology have been studied of late years, and I am sure that a comparative study of medical science by scholars will lead to interesting discoveries. So I have added descriptions of the instruments according to the Greeks, Romans and Arabs at the end of the descriptions given in Sanskrit books: the former serving as commentaries on the latter.

Seventhly, in the accounts of historians, travellers and pligrims from foreign countries, may be found notices of medical science, as they saw it practised during their sojourn in a country, and such impressions, if properly collated, may bear impartial testimony to the progress of the science at the time. Again, we must enquire if the original treatises of medicine can be proved to have been translated into different languages and whether the remedial agents of a country can be traced in the Pharmacopæias of different nations. Thus we

learn from the accounts of Houen Tsang and Fa Hian that charitable institutions such as hospitals, dispensaries and Pûnyasālās (Houses of Charity) were quite common in ancient India, Arrian informs us in his Indica that the study of medicine among the Brahmans was in great favour. We know that the standard works on medicine were translated in Arabic in the 8th Century B. C., and that various medicinal herbs of Indian origin found their way into the Greek Materia Medica.

Eighthly, we must enquire whether the medical practice of ancient times is still resorted to by the physicians of the present days. The Hindu system of medicine is still being practised all over India, more or less in its original form, and so can still be studied at first hand. But for our present purpose, we derive little or no help from the Vaids of the present generation. They know practically nothing about anatomy and surgery which began to decline during the Buddhist era, and finally all vestiges of the science became lost during the Mahomedan rule. I have spared no pains to exhaust these sources of information so far as surgical instruments are concerned. Whether or not I have been fortunate enough to give just the necessary details of instruments from the best accessible authorities without at the same time loading my pages with superflous matter, must be left to the judgment of my readers to determine.

¹ Beal's Buddhist Records of the Western World, Vol. I., P. 165, 198 and 214; Vol. II., p. 188 and 303.

a Arrian's Indica c. 27.

^{*} Alberuni's India, Sachau's Preface, p. XXX—XXXI.

^{*} Royle's Antiquity of Hindu Medicine, p. 77-113.

Now it may be asked why the Science and Art of Surgery, which was successfully practised in Ancient India, is so much neglected by the present generation of *Vaids*. So let us consider the causes that led to the downfall of Hindu Surgery:

- 1. The Hindus from a very early period have given up the dissection of human bodies—the only trustworthy method of acquiring anatomical knowledge—merely because it may occasion ceremonial uncleanliness. The Ancient Hindus were, however, free from such prejudices. Manu lays down that mere bathing will purify a Brahman who has touched a corpse, whilst stroking a cow or looking at the Sun, having only sprinkled his mouth with water will remove the defilement due to touching a dead bone. But even in the Manusamhita, we can trace the decline of Hindu surgery, and his law forbidding any one from eating food from the hands of a doctor evidently refers to a surgeon.
- 2. The interference of the priests in India, as in Europe played an important part. They began to cure diseases by spells, charms, texts and drugs; and temples have served as consulting rooms for the treatment as much of the diseases.

The Institutes of Manu, Ch. V, 85,

Ibid, Ch. V, 87.

विवाकी शिमुदकां च पतितं मृतिकां तथा। अवं तत्स्पृष्टिमं चैव स्पृष्ठा स्नानेम ग्रन्थति॥

नारं सृद्दास्य सस्ते संस्थाता विष्रो विश्वच्यति । आवस्येव तु निसे इं गामालस्थार्वमीस्यवा ॥

Ibid, Ch. III, 152; Ch. IV, vs. 212 and 220.

of the body as of the soul. The example of such a temple we still find in Tārakeśvar where many sick people repair to have their maladies cured by dreams, hypnotic suggestions and incubation or temple-sleep. Similar practice was prevalent in Egypt and Greece in olden times. The modern practice of using galvanic rings and abdominal belts is merely an advanced method of indulging in superstitions ideas.

3. The patients always dreaded the surgeon's knife—especially when the use of a general anæsthetic was unknown. At the same time, the comparative success of poultices, actual and potential cauteries, and other external applications have influenced the lay mind that operations by knife are not always needed. The Hindu surgeons themselves believed in similar tenets, for Susruta, the surgeon, remarks that "of all cutting instruments and their substitutes, caustics (or vegetable alkalies) are the most important, because by means of them, deep and superficial incisions and scarifications may be made, and derangements of the three humours (air, bile and phlegm) may be rectified"; and again he says that "with

विश्वीषधि विना देवि शस्त्रविद्या सुनिष्फला। वैकार्य कुकते या च दृश्चिक्तस्य श्रधानारे॥ जायने हि यद्याशींस पाटितानि पुन: पुन:। विश्वे तव शस्त्रसाध्यं स्थात् सुसिडेभेषजैर्विना॥ धातुनां व्यापदि यत्र भेषजे नैव सिडाति। श्राभये दुसरे तिखान् शस्त्रमेव विधीयते॥ पुन: संश्रमनं तच धातुनाम् हि प्रशानाये। प्रदातव्यं महादेवि श्रस्तादव्याक् त्रवीमि ते॥

regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not reappear, and because it can cure diseases which are incurable by medicines, instruments and caustics."

Thus we see that the Hindus were partial to external applications as a cure of surgical diseases, and gradually they neglected the surgical operations—one of the most important means of acquiring knowledge in Morbid Anatomy and of testing the correctness of diagonosis, in the absence of the post mortem examinations of the cadavers. Thus not only surgery but medicine also suffered materially.

4. The Hindus always cherish a high regard for the writings of their sages, and the earliest works on medicine became the standard works and were held sacred. Any violation of their opinions was considered a sacrilege; and all knowledge thus soon became stereotyped. In later times, none dared to question the validity of the statements contained therein, and though about three thousand years have elapsed, and though the votaries of the science are still honoured and wellpaid, the science instead of improving has markedly deteriorated. In fact, only two authors—Caraka and Susruta—are original; the later authorities—and there is a vast number of them—were merely their servile copyists who only differed from them when they indulged in some grave errors. We have a parallel in the history of medical science in Europe, where Galen

भारादिश्रिगरीयान् क्रियास् व्याखातसद्ग्यानां रीगानामपुनभावाद्वेषजशस्त्रचारैर-साव्यानां तत्साव्यवादाः।

held his sway over the profession for about two thousand years.

- 5. One of the potent causes of progressive decadence in the knowledge and practice of surgery amongst the Hindus is the rapid spread of Buddhism in India. Though Buddha sanctioned the use of the lancet in some cases, in cases of a doubtful nature he prohibited the use of instruments in the treatment of even surgical diseases. For example, he allowed the surgical treatment of boils by knife, but he prohibited not only the use of the lancet for treatment of fistula-in-ano but the use of clysters also. As it would be interesting to know the reasons of this prohibition, I quote the story in full from the Mohāvāgga (Sacred Books of the East):
 - Now when the Blessed One had remained at Såvatthi
 as long as he thought fit, he went forth on his journey to
 Rågagaha; and wandering straight on he arrived at Rågagaha;
 and there at Rågagaha he stayed at the Veluvana in the
 Kalandaka-nivåpa.

Now at that time a certain Bhikkhu was suffering from fistula. And the physician (named) Åkâsa-gotta lanced it. And the Blessed One when he was going round through the sleeping-places came to the place where that Bhikkhu dwelt.

 Akâsa-gotta, the physician, saw the Blessed One coming from afar; and when he saw him he said to the Blessed One: 'Let the venerable Gotama come and look at this Bhikkhu's orifice;

Mohāvāgga, VI. 14, 4 & 5,

^{*} Ibid, VI. 22, 3,

³ Ibid, VI. 22.

it is like the mouth of an iguana!' And the Blessed One thinking, 'This foolish fellow is making fun of me,' kept silence and turned away. And in that connection, and on account of that, he called a meeting of the Bhikkhu-samgha, and asked the Bhikkhus: 'Is there, O Bhikkhus, in that Vihâra a Bhikkhu who is sick?'

'There is, Lord.'

'What is the matter, O Bhikkhus, with that Bhikkhu?'

'That venerable one, Lord, has a fistula, and Akasa-gotta the physician, has been lancing it.'

3. The Blessed Buddha rebuked (that Bhikkhu), saying, 'This is improper, O Bhikkhus, for that foolish one, unbecoming, indecent, unworthy of Samanas, not allowable and ought not to be done. How can this foolish fellow, O Bhikkhus, allow a surgical operation to be perfermed in that part of his body? The skin there, O Bhikkhus, is tender, the wound is difficult to treat, the knife is difficult to guide. This will not redound, O Bhikkhus, to the conversion of the unconverted.'

And having rebuked him, the Blessed One, after delivering a religious discourse, said to the Bhikkhus: 'You are not, O Bhikkhus, to allow a surgical operation to be performed upon you in that part of your bodies. Whosoever allows that, is guilty of thullakkaya offence."

 Now at that time Khabbaggiya Bhikkhus, since a surgical opperation had been forbidden by the Blessed One, used a clyster.

They told this thing to the Blessed One.

'Is it true, as they say, O Bhikkhus, that the Khabbaggiya Bhikkhus use a clyster?'

'It is true, my Lord.'

He rebuked them, and having delivered a religious discourse, said to the Bhikkhus: 'No surgical opperation is to be performed within a distance of two inches round the anus, and a clyster is not to be used. Whoever does so, is guilty of a thullakkaya offence.'

And thus we find that Jīvaka, the famous surgeon, is said to have cured a case of fistula-in-ano by the single application of an ointment. The operation fell into such disuse that when Śańkarāchāryya suffered from the same disease, no surgical aid was thought necessary by the physicians, though it is said that he was treated by renowned doctors of the time. 2

From Megastkenes," we learn that "among the Sarmans the Hylobioi (living in woods) were held in most honour, and next to them the physicians, who are mendicants and also ascetics, like the class above them and the class below them,

¹ "And Gîvaka Komârabhakka healed the fistula of the Magadha King Seniya Bimbisâra by one anointing."

Mohāvāgga (Sacred Books of the East), VIII. 1. 15.

अविकित्स्यभगन्दराध्यरीगश्वरक्तीश्वतपदिलस्वश्राद्याः । अञ्जनुप्स्यविश्रीधनादिकपां परिचर्यामकताऽस्य तीटकार्यः ॥ * * * * * * * निगदिते सुनिनेति भिषम्बरा विद्धिरै वष्ट्रधागदसन्क्रियाः । न च श्रशाम गदीवङ्गतापदीविमनसः पटवी भिषजीऽभवन् ॥

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which consisted of sorcerers and fortune-tellers;" and Strabo* mentions that these physicians "cured diseases by diet rather than by medicinal remedies, which were chiefly unguents and cataplasms."

6. No science can flourish without the support of the government of the day. The Hindus became a subject race; and any departure from the traditional store of knowledge in the shape of improvement in the quality and additions to its quantity was neither tolerated by the people, who are proverbially conservative, nor countenanced by the royal court, for the conquerors brought with them and patronised their own hakeems and doctors. Neither the Mahomedans nor the English have taken any real interest in the Indian Medical Science from preconcieved notions that it contains nothing worthy of their perusal. The Kavirajes again are so conservative in their opinions that they can not boldly advocate even the use of such drugs as are of unquestionable value in the treatment of diseases, as for example the use of Quinine in Malaria. To this may be contrasted the behaviour of Bhavamisra, who lived about three hundred years back and, who adopted many medicaments of foreign origin. The consequence can easily be imagined, and in the language of Elphinstone, can be thus described: "Physicians follow the practice of their instructor without inquiry, and surgery is so far neglected, that bleeding is left to the barber, bonesetting to the herdsman, and every one is ready to administer

¹ The Invasion of Alexander the Great, M'Crindle, Appendices, p. 358,

Geography, XV. i. 58-60.

The Invasion of Alexander the Great, M'Crindle, Appendices, p. 368-69.

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a blister, which is done with the juice of the euphorbium and still oftner with the actual cautery."1

But we need not enlarge any further. The object of this essay is not to write out an exhaustive dissertation on the Hindu medical science but by a few suggestive facts, however imperfect and fragmentary, to stimulate curiosity and divert attention of the diligent scholars to a vast field of research, which seems as yet to have been only partially explored.

It is proper here to acknowledge that I have on all occasions freely availed myself of the labours of Drs. Wise, Thakore Saheb of Gondal, and the translators of Susruta Samhita in the Biblotheca Indica, namely, Dutt and Hoernle. It is a great pity that this translation has not as yet progressed beyond three fasciculi. Hoernle's recent contribution, "Osteology of the Hindus," is a move in the right direction and we hope it to be followed by similar enquiries in other branches of the science. Royle for the first time proved beyond doubt the high antiquity of Hindu medicine, and established its right position in the history of the science. Wise · is the pioneer of systematic research in this field of study, and his sympathetic appreciation of the Hindu system of medicine will always be remembered with gratitude by our countrymen. Dutt's Materia Medica of the Hindus is a work of great merit; and I have derived material assistance from the excellent treatise, "History of Aryan Medical Science," by the Thakore Saheb of Gondal. Dr. Ray's History of Hindu Chemistry is a valuable contribution in the cognate subject of chemistry. I have borrowed from these writers largely, but

Elphinstone's History of India, 5th Ed., p. 160.

I flatter myself it will also be found that I have further collected from various sources a store of valuable information, for which I am in no way indebted to any of my predecessors in the same field of research. The descriptions of the surgical instruments of the Greeks, the Romans and the Arabs, I have taken from the excellent English translations of Paulus Ægineta, the Extant Works of Ætius and the Genuine Works of Hippocrates, prepared by the renowned Adams, for the Sydenham Society. I have also laid the recent monograph, "Surgical instruments in Greek and Roman times" by Dr. Milne, largely under contribution; I only regret that I had no access to the book a little earlier, otherwise much of my labour in search for descriptions of the instruments of the Greeks would have been saved. For the last five years, I have been engaged on this investigation and it was when I had nearly finished, that Milne's book was mentioned to me by the Hon'ble Mr. Justice Asutosh Mookerjee, the Vice-Chancellor of the Calcutta University and the President of the Asiatic Society of Bengal.

To complete the subject, I have added plates of nearly all the varieties of instruments; but they are more or less hypothetical as we do not possess any actual specimens of the instruments of the Hindus. Written descriptions of surgical instruments are uninteresting and often fail to convey the true idea, which could be easily made evident by the pencil. For purposes of comparison I have given drawings of instruments of the Greeks, the Romans and the Arabs, when I thought that they might be of value for the proper elucidation of my subject. I am indebted to many authors

I am indebted to many authors for some of the engravings of the instruments. I have been careful to give the source whence the borrowed ones are taken, as far as I have been able to ascertain them. If this has been omitted in any ease, it is from inadvertence, not from design. My best thanks are due to them and I here acknowledge my indebtedness to the authors for availing myself of their labours without their permission. But many new illustrations will be found, and I have appended my name to those drawn by myself. These figures of the surgical instruments would be found to tally better with the descriptions of the instruments given in the Sanskrit books than the illustrations of the previous authors. The drawings of surgical instruments as given by me would look more like the figures in a modern catalogue of surgical instruments. Some of my friends could hardly believe when they saw the plates that these instruments were known to the ancient Hindus at such an early age. This feeling of amazement and incredulaty as regards the surgical instruments used by the ancient Hindus has its parallel in the observations of Billroth¹ about the surgical instruments found in the excavations at Pompeü and now preserved in the museum at Naples. He says: "It made a pecular impression upon me; when I saw before me this two thousand years old surgical armamentarium of a Roman colleague, differing but slightly in the form of the more ordinary instruments from those of our time. Ars longa vita brevis." Milne2 also remarks: "The works of those (Paré, Scultetus and Heister) are profusely illustrated with instruments, some of which can plainly be seen to tally exactly with the descriptions of the classical authors."

Billroth's Surgery, Vol. I, Introduction, Page 7, Syd. Soc. Ed.

Graco-Roman Surgical Instruments, P. S.

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In describing the surgical instruments, I have confined myself strictly to the texts of the authors and commentators whom I have quoted, and have given the original Sanskrit passages in the foot-notes. The swill be of great help to scholars who will try to study the subject at first hand, and prosecute further historical inquiries. The references in the foot-notes do not refer to pages of any particulars edition of the work, as such pagination causes inconvenience to the readers who may not secure the edition in question; so we have given the section, and chapter of the book which will be found in any edition.

In the translations of Sanskrit passages, I have endeavoured to follow the original as closely as possible, except where a somewhat free rendering was necessary to make the meaning clear.

The dates of the ancient Hindu authors of Sanskrit medical books cannot be ascertained with certainty. In the first chapter I have endeavoured to discuss briefly their approximate ages. But as I have compared the surgical instruments of the ancient Hindus with those of the Greeks, Romans and Arabs, a concise summary of the chronological dates of the Greeco-Roman, Arab, and the later authors would be a great help in the proper elucidation of my text.

Authors.	uthors.		Date.		
Pythagoras	1660		580-504 B.C.		
Megasthenes	***		800 B.C.		
Ktesias		2000	400 B.C.		
Hippoerates	***		460 B.C.		
Hero of Alexandr	ia	***	285-222 B.C.		

Authors.	Date.
Dioscorides	First century A.D.
Celsus	25-30 B.C. to 45-50 A.D.
Scribonius Largus	45 A.D.
Soranus	First century A.D.
Rufus of Ephesus	98-117 A.D.
Galen	131-201 A.D.
Marcellus Empiricus	300 A.D.
Antyllus	3rd century, A.D.
Oribasius	326-403 A.D.
Theodore Priscianus	4th century A.D.
Caelius Aurelianus	4th or 5th century A.D.
Mosehion	5th century A.D.
Actius	5th century A.D.
Alexendar of Tralles	525-605 A.D.
Paulus Ægineta · · ·	660 A.D.
Serapion	800 A.D.
Rhazes	850-932 A.D.
Haly Abbas	After 950 A.D.
Avicenna	980-1037 A.D.
Abul Cassim	x 1106 A.D.
Avenzoar	
Paré	
Scultetus	
Heister	1739 A.D.

I can not suffer this work to go forth without offering at least an explanation of, if not an apology for, the delay which has occurred in the publication of this thesis. It is mainly due to the accidental fire which reduced the types and the blocks -XX PREFACE.

for this work to ashes and distroyed a part of the manuscript. This portion had to be written again. Again the task of reading proof sheets was laid on me entirely. The occupation of a laborious profession encroached on my time; and I was not fortunate enough to secure the co-operation of any worker in this field of research. The result might be anticipated and no one is more conscious of the unsatisfactory issue than myself. I had no experience in proof reading, and so mistakes are not Some of the errors will be found corrected uncommon. in the corrigenda. As regards the corrections of many of the proof sheets of the Sanskrit foot-notes I was assisted by my son Hirendranath Mukhopadhaya, who helped me much in getting this book completed. The author will feel obliged if informed of any errors that may be detected and of references to informations which ought to have been given, and also for any hints that may make a future edition more useful to the readers. But I have this consolation in my mind that I have not pushed this work through the press hurriedly or prefunctorily and I have done my best. I have laboured with the usual drawbacks of an active professonal life and if this be admitted by the critic as an excuse for errors and failures, I shall be grateful to him.

A copious index has been provided for this work, whereby anything material in the whole book may be readily found out; of which it may be said that it wants no other advantages than such as the author had not power to give.

It would not be out of place here to mention that part of this essay was read before the Asiatic Society of Bengal in June, July and August, 1908. The learned President in his annual address remarked as follows: "In the course of the last session Dr. Girindranath Mukerjee submitted to the society a paper of considerable extent, in which he elaborately examined the subject of the surgical instruments of the ancient Hindus. The questions he has raised, as to the priority of Hindu medicine over that of the Greeks, the Romans and the Arabs, are likely to arouse controversy, but in whatever way the question of priority may be decided, it seems to me truly remarkable that the descriptions given in our most ancient books on medicine, of the surgical Instruments then in use, should bear a close resemblance to the descriptions given not only in Greek, Roman and Arab medical writings but in many cases with the descriptions given in medern works on surgery. I trust that this subject, so peculiarly Indian, will not be left alone and will receive the attention from investigators which it undoubtedly deserves."

As regards the transliteration of Sanskrit words, we have employed the method adopted in the Congress of Orientalists and circulated in the Journal of the Royal Asiatic Society, ignoring in fact, the unpleasant characters of the Sacred Book of the East.

Journal and Proceedings of the Asiatic Society of Bengal, Vol. V, 1909, Annual Address, p. XXX.

I SANSKRIT AND ALLIED ALPHABETS.

प a	श्री 0	z t	ब b
चा ā	षी au	3 th	भ bh
¥ i	南 . k	s d	म m
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* (Anunāsika) m Udātta			
: (Visarge	a) h	Svarita	
× (Jihvām	ūlīya) . h	Anudātta	
× (Upadhmānīya) h			

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DISCRIPTION OF THE BLUNT INSTRUMENTS

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The Svastika yantra or cruciform Instruments:
 Simhamukha svastika or Lion-faced forceps.
 Vyäghramukha or Tiger forceps. Vṛkamukha
 or Wolf forceps. Tarakṣumukha or Hyena
 forceps. Rkṣamukha or Bear forceps.
 Dwipimukha or Panther forceps. Mārjāramukha or Cat forceps. Śṛgālamukha or Jackal
 forceps. Airbbāruka or Deer forceps. Kākamukha or Crow forceps. Kaňkamukha or
 Heron forceps. Kuraramukha or Osprey forceps. Cāsamukha or Blue-Jay forceps. Bhāsamukha or Eagle forceps. Śaśaghātīmukha
 or Hawk forceps. Ulukamukha or owl forceps.
 Cillimukha or Kite forceps. Syenamukha or
 Vulture forceps. Gṛdhramukha or Falcon forceps.

Krauńcamukha or Curlew forceps. Bhrúgarajamukha or Butcher-bird forceps. Anjalikarna forceps. Avabhañjanamukha forceps. Nandimukha forceps. II. The Sandamsa or Pincherlike forceps: Forceps with and without handles. Forceps with Smooth and rough ends. Epilation forceps. Mucuti or Mucundi. Vamsabidala or Bamboo forceps. III. Tāla-Yantra or Picklock-like instrument: Ectāla and Dvitāla. The Ear-scoop. IV. The Nadī-Yantra or Tubular instruments: Kanthaśalyāvalokini or Throat speculum. Pańcamuka and Tubular instruments for inspec-Trimukha. tion of arrows. Salyanirghātanī. The Impellent. Tubular instruments for Piles-for inspection and medication. Samī. The Rectal Speculum. Calopter. Tubular instruments for the Fistula-in-ano. Tubular instruments for the nose: Nasal Speculum. Nathu-karani and Yamaka-nathu-karani. Nasal tubes, The Anguli-tranaka or Finger-guard. Yoni-Vraneksana or Vaginal Speculum, Diopter, Bivalve Speculum. The tubular instruments for wounds-Vrana-vasti or Wound-Syringe. Tubular instrument for ascites. Dākodara yantra or Canula. Tubular instruments for Hydrocele. Tubular instruments for rectal stricture. Tubular instruments for injection into the rectum-Vasti Yantra or Rectal clyster. Uttaravasti or urethral, vaginal and uterine Tubular instruments for tubes. Catheters. inhalation and fumigation. Disinfection of rooms, clothes &c. Tubular instruments for cupping. Śróga or horn. Alābu Yantra or gourd. Ghati Yantra. V. Salaka

or rods: Earthworm probes. Arrow probe. Snake's hood probe. Fish-hook probes. Śańkus; Swab probe. Spathomele or spatula probe. Spoon-shaped probes. Cyathiscomele. Nail-shaped probes. Jāmvavaustha probe. Gamma-shaped probe and the ankuśa cautery. Collyrium probes. Karna Sodhana or Earcleaner. Garbha-Śańku or Fœtus or Traction hook. Yujña-Sanku or Midwifery forceps. Sarpa-fana or snake's hood-like rods. Stone extractor. Hippocratic oath. Sarapuńkhamukha Probe. Arddhacandramukha or Halfmoon Probe. Bone Lever. Director, Urethral Probe. VI. The Upayantra or Accessory Instruments. Rajju or thread, Venikā or twine; Patta or Bandages, Abdominal binder, Field Hospital, Dressings. Carma or leather: leather bandage, leathar ligatures. Yantra-Sataka or Lithotomy-Strap or binding apparatus, Pāśa. Leather bags. Śfrovasti or leather-bag for the head. Leather Band. Leather Bottles, Jars, etc. Antarvalkala or Barks. The crutches, Tendrils of creepers or Latā, Vastra or cloth. Asthilāsma or stone. Mudgara or Hammer. Pänipadatala or hand and foot. Auguli or fingers. Jihvā or tongue. Danta or tooth. Nakha or nails. Mukha or mouth. Vala or hair. Probang. Suture material. Aśvakataka or the ring of a horse's bridle. Sākhā or branch of a tree. Sthīvana or spittle. Pravahana or fluxing the patient. Har a or Happiness. Ayaskānta or Load-stone. Ksāra or Caustics or Potential cautery. Agni or Actual cautery. Bhesaja or medicines, Goats' gut; Arrest of hæmorrhage.

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THE

Surgical Instruments of the Hindus.

CHAPTER I.

and there-

INTRODUCTION.

ANCIENT MEDICAL AUTHORS AND THEIR WORKS.

The Science and Art of Medicine, like many other different branches of learning originated with the Hindus. They consider the art of healing as an Upaveda and it is generally known as Ayurveda, that is the art of prologing life. Like the Vedas, they trace the origin of the science to God, the fountain of all true knowledge. Bramhā transmitted this heaven-born science to this world for benefit of the mortals in one of the sacred writings, the Ayurveda.

It was composed as a sub-division of the Atharva Veda and consisted originally of a *lākh slokas* or a hundred thousand stonzas, divided into a thousand chapters. Then considering the short span of life and inadequate intelligence of man, he divided the book into eight parts as follows:—

कायिविकित्सा शालाका शत्त्रहर्मुक विषयरवैरीधिकप्रश्रमनं मृतविद्या कौमारभत्यक रमायनानि वाजीकरणमिति। Caraka Samhita, L xxx.

वेदी शायवंषः सम्बयमवलिमङ्गलशीमनिदमप्रायश्चित्तीपवासमनादिपरिदशात् चिकित्साँ प्राप्तः।

[े] तदाया ॥ जलां जालाकां कायविकित्वा भृतविद्या कौमारश्यस्यदतलाम् रमायनतलां वाजीकरणतलामिति ॥ Suáruta Sambita, I. i.

- 1. Salya Tantra or Major Surgery.
- 2. Šālākya Tantra or Surgery of parts above the Clavicles.
- 3. Kāya Cikitsā or Inner Medicine.
- 4. Bhūtvidyā or Demnology.
- 5. Kaumārabhṛtya or the Science of Pædiatrics.
- 6. Agada or Toxicology.
- 7. Rasāyana or Treatment to prolong life.
- 8. Vājikarana or Treatment to stimulate the sexual power.

The book is no more available now, Susruta being the authority for the above information.¹

A different view is held by others, who trace the origin of Hindu Medicine in the verses of the Rgveda.²

इह खलायुर्वेदी नाम यदुपाइमचर्लवेदसातृत्वादीव प्रजा: श्रीकशतसहस-मध्यायसहस्तव कतवान् स्वयभूः। ततीऽत्वायुश्मत्वमेधमृत्वावलीका नरावां स्यीऽध्धा प्रवीतवान्॥

. .. Susruta Samhita, I. i.

तत्र चेत् प्रष्टारः साः चतुर्णासकसामयज्ञरवर्षवेदानां कं वेदसुपदिशक्यायुर्वेदविदः।
किमायुः कस्मादायुर्वेदः किञ्चायमायुर्वेदः शास्वतीऽशास्वत इति। कानि चासाङ्गानि
क्यायमधातव्यः किमर्वचीति॥

तत्र भिषजा पृष्ठेनेवं चतुर्णासक्सामयज्ञरयकंवेदानाम् चातानीऽयकंवेदे भिक्तरादेखाः । Caraka Samhitä, L xxx.

The origin of medical science, as quoted in the above passage of Caraka, does not however agree with the view expressed by the author in the Sütra Sthäna, Ch. I. (See footnote 1. P. 4). In Ch. XXX, we find that an attempt had been made to make a compromise between the two views of Agnivesa and Susruta. Evidently this was the work of a later reductor, possibly Drdhavala.

न ज्ञायुव्ये दस्मास्त्रीतिरपत्तभते । अस्वाववीधीपर्दशास्त्रासेत्रदे स्यमधिकत्य उत्पत्ति-सुपदिशस्त्रेके सामाविकवासा जववमधिकत्य यदुकम् इह चार्यचाधार्ये । ।

ऋमोदसाायुर्वेद उपवेद:।

Caraka Samhita, L xxx.

Carana Vyūha by Vyāsa.

ATHARVA VEDA.

"On examining the contents of the Atharva Veda more in detail, we find that the hostile charms it contains are directed largely against various diseases or the demons which are supposed to cause them. There are spells to cure fever (takman), leprosy, jaundice, dropsy, scrofula, cough, ophthalmia, baldness, lack of vital power, fractures and wounds; the bite of snakes or injurious insects, and poison in general; mania and other ailments. These charms are accompanied by the employment of appropriate herbs. Hence the Atharva Veda is the oldest literary monument of Indian Medicine."1 This Veda can not belong to a period later than 1000 B. C., but possibly earlier.2 It exists in the recensions of two different schools. That of the Paippalada is only known in manuscript, discovered by Prof. Buhler in Kashmir and described by Prof. Roth in his tract Der Atharva Veda in Kaschmir (1875). The printed text, edited by Roth and Whitney in Berlin 1856, gives the recension of the Śaunaka School.³ It has been translated into English Prose by Whitney, 2 Vols.; into English verse by Griffith, 2 Vols., Benares, 1897, and with the omission of the unimportant

¹ Modonnel's Sanskrit Literature, P. 196.

श्यकंवेदस्य ०००० चतुर्धं वेदलेऽपि प्रायेशाभिचारयर्थलाद्यज्ञविद्यायामनुप-यीगाचानिर्हेग:। तथाहि सम्बेदेनैव हीषं कुर्वन् यजुर्वेदेनाप्ययंवं सामवेदेनीद्वापं यदेव वयी विद्याय मृजन्तेन ब्रह्मलमितियुते स्वयीसन्पादालं यज्ञानो जायते।

Kallūka Bhatta's Commentary on Manu Samhitā, Ch. III, Śloka L.

On the date of Atharva Veda, see pp. CXL—CLXI, Prof. Lanman's Edition of Whitney's Transl.; Prof. Medonnel's Sanskrit Literature, pp. 185—201.

Index Vervorum in the Journal of the Am. Or, Soc. Vol. XII,

hymns, by Bloomfield¹ into English Prose, with notes, in Vol. XLIII of the Sacred Books of the East.

CARAKA SAMHITA

In the Caraka Samhitā we find that Brahmā taught Dakṣa the science of medicine; Dakṣa became the preceptor of the Aśvin twins; they in their turn became the teachers of Indra and Indra imparted this knowledge to Bharadvāja who was sent by a conclave of sages to learn the art for the welfare of the human race. Bharadvāja had Punarvasu Ātreya and the others as disciples. Ātreya's students were Agniveśa, Bhela, Jatukarṇa, Parāśara, Hārīta and Kṣārapaṇi, all of whom became celebrated as the authors of treatises on Medicine; the Caraka Samhitā being a revised and improved edition of the treatise of Agniveśa, which was declared to be the best production. Caraka did not, however, redact the whole

Caraka Samhita, I, i.

He has also edited the Kausika Sütra of the Atharva Veda, with extracts from the commentaries of Darita and Kesava (see Vol. XIV Journ. Am. Orient. Soc.). It is very useful as a help to the proper understanding of the meaning of a hymn.

दीर्घकीवितमस्तिक्षन् भरदाज उपागमत्। इन्द्रमुयतपा नुद्रा अरस्यममरिश्वरम्॥ अञ्चला हि यथा प्रीक्रमायुर्व्वदं प्रजापति:। जयाङ निखिलेनादावश्विनो तु प्रनस्ततः॥ पश्चिमां भगवान् शकः प्रतिपदे इ केवलम्। क्षिप्रोको भरदाजसम्याच्छकमुपागमत्॥

अध मैनीपरः पुगलमायुर्वेदः पुनर्वसः। शिष्येश्यो दलवान् षड्यः सर्वमृतानुकान्पया॥ षपिनेशव मिलय जतुक्वः पराश्ररः। इतिः चारपाणिय जरण्डसमुनेवेदः॥ वृद्धेविशेषस्वासीकीपदेशान्तरं मुनेः। तनस्यं कर्ता प्रथममधिनेशी यतीऽभवत्॥ भव मेलादयश्रकु सं स्वं तलं क्रतानि च। यावशासासुरानेशं सर्थमहं सुनेधसः॥

book;—the last forty-four chapters¹ were edited by Dṛḍha-vala,² a native of Panchanadapura, long supposed to refer to Punjab (the land of five rivers) but at present identified with a town in Kashmir by Dr. Hoernle.³ Two other works, the treatises of Bhela and Hārīta, are still extant; the former existing in manuscript in the Tanjore Library⁴ and the latter as printed texts by Kavirājes K. C. Sen and B. L. Sen, of Calcutta.⁵

Now as regards the age of Caraka, there is great divergence of opinions. The Indians generally believe him to be a Rsi of great antiquity while the European scholars try

अतस्त्रीत्तमसिदं चरकैणातिवृद्धिना । संस्कृतं तत् तु संख्टं विभागिनीपलस्यते ॥ इदमन्यूनमञ्दासं तन्ते दीस्पविवर्ण्यतं । अस्तर्यासं इदवली जातः पचनदे पृरे ॥ कत्वा वष्ट्यसन्त्रेशी विभोषास वलीस्यम् । समदभौषधाध्यायसिद्धिकत्येरपुरयत् ॥

Caraka Samhitā, VIII, xii.

चित्रम् समदशाध्यायाः कल्पाः सिद्धय एव च । नासायानेऽप्रिवेशस्य तन्ते चरकसंस्कृते ॥ तानेतान् कापिलवलः श्रीयान् हद्वलीऽकरीत् । तनस्यास्य महार्थस्य पुरवार्थे यथात्यम् ॥

Ibid, VI, xxx.

- ³ Hoernle's Studies in the Medicine of Ancient India, Part I, Osteology, Introduction, p. 2. See also his article on "The authorship of Caraka Sanhita" in the Archiv für die Geschichte der Medizin, 1907.
 - See Burnell's Tanjore Catalogue No. 10773 of Sanskrit Mss., P. 63.

¹ For a discussion on the part added by Dṛḍhavala, see Hoernle's Studies in Ancient Indian Medicine, J. R. A. S. 1908, P. 997-1002. Also see pp. 11-15 in the Vanauşadhi Darpaņa, Vol. I., by Kavirāja Birajā Charan Gupta, 1908.

^{*} It is doubtful whether the Hārita Samhitā is the genuine work of the Rṣi, Hārita. The printed text refers to Caraka, Suśruta and even Vägbhaṭa, who were decidely posterior to Hārita, See the Footnote 3, P. 6.

to connect him with historical events of more modern times. Sylvain Lévi has recently discovered in the Chinese Translation of the Buddhist *Tripitaka* that Caraka was the Court Physician of the Indo-Scythian King Kaniska, in the first century A.D.¹ But the following objections are to be met with before his conclusions can be accepted as proved:—

- 1. The age of Kanişka is not yet settled, the probable limits of his reign being from the first century B. C. to the second century A. D. Moreover in the Buddhist *Tripitaka* referred to, the name of Caraka is simply mentioned as the Court Physician of the King Kanişka but there is nothing to identify him with the author of the book. The same name, found in different places, does by no means signify the same person.
- 2. The time assigned to Caraka by the Indian medical tradition is of great antiquity. With regard to the chronological position of the three old authors, he is mentioned as anterior to Suśruta and Vägbhaṭa I.³
- 3. Dr. Rāy has pointed out that the name Caraka is patronymic in the Veda. It is quite possible that a much

See Journual Asiatique—July to December 1896, p. 444 to 484 and January to June 1897, p. 5 to 42; also Indian Antiquary Vol. XXXII, 1903, p. 382 and Viena Oriental Journal, Vol. XI., p. 164.

^{*} See V. A. Smith's Early History of India, P. 225-26.

Dr. Fleet in J. R. A. S., 1906, P. 979.

Dr. Bhandarkar in J. R. A. S. (Bombay Branch), Vol. XX, P. 269.

J. A. S. B. Vol. XXXIX, 1870, p. 65 and 126.

चरक: सुयुत्तवैद वाग्भटक्च तथापर: । मुख्याक्च संकिता वाच्याखिच एव युगे युगे ॥ अति: कतयुगे वैद्यो दापर सुयुतो मत: । क्ली वाग्भटनामा च गरिमाव प्रदेश्यते ।

Harita Samhita, Parisistadhaya.

^{*} Dr. P. C. Ray's History of Hindu Chemistry, Introduction, P. X.

later namesake of his, is referred to by the *Tripitaka*, just as we know that more than one Vägbhaṭa appeared as successful physician. Agaiñ we have evidence that eminent physicians in later times were called Caraka by way of a compliment and so Vägbhaṭa was called Caraka of Sindh or Sindhicara.

- 4. Pāṇini wrote special Sūtras for the Agniveśas and the Carakas. These names must have been famous before Pāṇini's time, otherwise he would not have written special Sūtras for them. Prof. Goldstucker has conclusively proved that Pāṇini could not have flourished later than the sixth century D. C.²
- 5. Patanjali wrote a commentary on Caraka. He flourished during the second century B. C. Both Cakrapanidatta and Bhoja allude to him as the redactor of Caraka Samhitā. So Caraka must have flourished long before him, for unless his work was regarded as a standard work of authority, Patanjali would not have taken so much pains to write notes on the book, and still more for issuing a redaction.
- 6. The internal evidence of the book itself speaks against such an assumption. There is no salutation to any diety at the

गर्गादिम्बी यण ॥ Tbid, 4. 1. 105.
गर्गा वत्स । ** * * प्रितिश * * * * पराश्रर । जतुक्यां । * * * .

^{*} Goldstucker's Pāṇini; and Journal of the Asiatic Society of Bengal, Vol. XLII, P. 254.

वातीनाम चनुभवेन वन्ततत्वस्य कात्वेंन निययवान्, रागादिवशादिप नान्यवावादी
 य: स इति चरके पतवितः।

Quoted in Laghumañjuṣā of Nāgeša Bhaṭṭa (Rāy). पातश्रल—महाभाष —चरकप्रतिसंख्यते: ।

सनीवाक्-कायदीवाणाम् इर्वेऽस्पितये नमः ॥ Vide salutation in the Avurvedarthadipika.

beginning of the book,—a custom invariably found to be observed in the more modern compilations. There is complete absence of Paurāṇic theology in the Caraka Samhitā, nor is there any reference to Śākya Muni and his religion. Kaniṣka was a great patron of Buddhism, and it might naturally be expected from the Court Physician of the king to describe the charitable hospitals which we know from the edict of Aśoka, to have flourished in every quarter of India. On the contrary we find descriptions of a hospital as reserved for rich men only at their own houses. Those gods and godesses that figure so prominently in the Purāṇas were unknown during his time.¹ Beef was not then, apparently, a

सम्बंग न तत प्रभवनि न चारिक्रस्त न्पचौराः ।
लव्मीय तत भजते यत महागश्यह स्थिति ॥
पिथामाण इमचात सिंड भन्तमृदीरयैत् ।

सम माता जया नाम विजयी नाम मे पिता ॥
सोऽइं जयी जयापुती विजयीऽय जयामि च ।
नमः पुरुषसिंहाय विचाव विश्वतक्यांची ॥
सनातनाय क्रणाय भवाय विभवाय च ।
तेजी व्याकपेः साचात् तेजी बह्रोन्द्रयीय्येमे ॥
ययाहं नाभिजानामि वासुदेवपराजयम ।

Caraka Samhita, VI, xxv.

But Krana and Vāsudeva are mentioned in Pāṇini as demigods, having many adherents who formed a class. ''वासुदेवान्त्रनामा दुन'' Pāṇini, 4. 3. 98. Again the passage may be an interpolation of a subsequent Vaignata Vaid.

So Bṛṣavadhvaja is also mentioned in Dṛḍhavala's Supplement, as a god to be worshipped during the preparation of some medicines :

त्रश्रघीषणद्वपटहिनरीनिनादै: सिद्धं सित्रक्षतकार्यं गणकस्मारीपयेद्वगवनं प्रयम्बन्नसमिप्ना तं से हं विभागमाचिकमङ्गाणीः स्तृतिदेवता ई नैवैक्तं गमयेत्॥

Ibid, VIII, xii.

No doubt the names of Laksmi, Kṛṣṇa and Väsudeva occur in Cikitsita Sthānam, Chapter XXV, but it should be remembered that they occur in the Supplement added by Dṛḍhavala in later times.

forbidden food, for it is spoken of as an article of diet that should not be indulged daily, nor should it be used in excessive quantity as it is mentioned as a cause of the disease, Vāta-Rakta.

The style of the book is antiquated and decidedly savours that of the Brāhmaṇas. Nāya and Vaišeṣiki systems occur in the text,³ and so probably the book was written long before the compilation of these Sūtras.

Editions.—The book had undergone several editions. It was edited by Jibānanda Vidyāsāgar, Calcutta, in 1877 and 1896 (2nd Ed.); by Gaṅgādhar Kaviratna, Berhampur, 1879; by Gupta, Calcutta, 1897; with commentary by Cakrapāṇidatta, Calcutta, 1892-93; by Jaśodānandana Sarkār, with Bengali translation, 1894.

Translations.—It had been translated into English by A. C. Kaviratna, Calcutta, 1897. Caraka was translated from Sanskrit

And we find that the antidote to poisen called महानसहसी is said to have been told by Tryambaka (Šiva) to Baiśravaņa (Kuvera):

अगरीऽसे वैत्रवणास्यातन्यस्वतेण पटाइ: ।

Caraka Samhitā, VI. xxv.

Also we find the name of Karttikeya mentioned in Sec. IV. ch. viii.

प्रसुव लमविक्रिटमविक्रिटा समानने, कार्त्तिकेययुति पुत्रं कार्त्तिकेयाभरचितमिति॥

कुर्चिकाय किलाटांय श्रीकरं गव्यमानियं। मत्यान् दिध च नायांव यावकांय न श्रीलयेत्॥

Ibid, I. v.

कुलत्यमावनिष्पावशाकादिपलिक्षिः।
 दश्वारमालसैवीरगुजतकसुरासवैः॥

Ibid, VI. xxix.

^{*} Vide Caraka, III. viii.

into Arabic in the beginning of the eighth century and his name "Sharaka Indianus" occurs in the Latin translations of Avicenna, Rhazes and Serapion. "A translation of the Karaka¹ from Sanskrit into Persian and from Persian into Arabic is mentioned in the Fihrst, (Finished 987 A.D.). It is likewise mentioned by Albērūnī²; the translation is said to have been made for the Barmekides." Albērūnī's chief source on Medicine was "Caraka, in the Arabic Edition of Ali Ibn Zain, from Trabaristan."

Commentaries.

- 1. Patanjali—2nd century B.C.—not available.
- Cakrapāṇidatta's Caraka Tātparya Tīkā, or Āyurvedadīpikā⁸—1060 A.D.
- 3. Haricandra 1111 A.D. not available.
- Śibadāsa's Caraka-Tattva-Pradipikā.
- Gangadhar's Jalpa-Kalpa-Taru—1879 A.D.
- ² Proceedings of the As. Soc., Bengal, 1870, September.
- Reinaud, Memoire sur l'Inde, P. 316.
- * Maxmuller's Science of Language, Vol. I., P. 168, Foot Note.
- Sachau's preface to India, P. XL.
- * See Caraka Samhitä with Cakrapāṇidatta's Commentary by Kurirāja Harināth Visārada, Calcutta, 1895.
- * A Commentary written by Haricandra is referred to in the Sanskrit Slokas narrating the geneology of Maheávara, the author of Viávaprakasa and Sahasankacarita, who flourished during the reign of Sahasanka, king of Gazipur in 1033 Saka (1111 A. D. Wilson).

श्रीसाइसाइ रूपते रणवदाविदा-

वैयीतरङ्ग पदपद्यतिसेव विसत्। यवन्द्रचारुचरिती इरिचल्डनासा

सद्मान्यया चरकतनमनंचकार ॥

SUŚRUTA SAMHITA.

The next treatise on Hindu Medicine is the Suśruta Samhitā. Suśruta was the son of the sage Viśvāmitra,¹ a contemporary of Rāma. He learned the Science of Medicine from Divodása, surnamed Dhanvantari, king of Benares, at his Himalayan retreat. According to Suśruta, Divodása was the incarnation of Dhanvantari, the celebrated physician of the gods in heaven, and he first propounded the Art of Healing in this world.² Suśruta represented the Surgical School while Caraka was pre-eminently a Physician in practice.

As regards the authorship of the book, opinions differ. To Suśruta, Dhanvantari addressed his lectures on Major Surgery,³

Mahābhārata, Anuśaşana Parva, Ch. 139, Vs. 8-11.

धननिर्धिर्मस्तां वृरिष्टी वान्तिभारदः । विश्वामिवाकानस्यि भिश्वं सुत्रुतमस्त्रभात् ॥ Susruta Samhita, V. ii.

षटाङ्यर्वेदविदं दिवीदासं महामति । क्त्रिशास्त्रावंसन्देहं स्वमागाधनिवोदिधं । विश्वामिवसुतः श्रीमान् सुयुतः परिप्रकृति ।

Ibid, VI. lxvi.

सर्वभास्तार्थतत्त्वज्ञ सपीदृष्टि सदारघी:। वैद्यासिवं ममासाथ जिथ्यं कामिपतिरसुनि:॥

Ibid, VI. xxviii.

- भव खलु भगवन्तममरवरस्थिगणपरिङ्गतमायमस्यं काशिराजं दिवीदासं धननिरिः मोपधनववैतरणीरसपोकालावतकरवीर्थगोपुररचितस्युतप्रधतय जनुः।

 Ibid, I. i.
- अधन कके किमुचतामित। त जनु:। अधाकं सर्वेषामेव अव्यज्ञानमूखं कर्लापदिअतु भगवानित। स उवाचैवमिनृति। अधाकमेकमतीना मतमभिसमीन्य सुत्रुती भगवना प्रत्यति।
 Ibid, I. i.

which he reproduced in this work. But in the opening lines of the book, salutation is offered to Brahmā, Dakṣa, Aśvins, Indra, Dhanvantari, Suśruta and others.1 This shows that Susruta can not be the author of the work or at least of the work in its present shape, for no author can offer salutation to himself. By "the others" are no doubt meant the notable surgeons who practised and taught the Science of Surgery and who were either contemporary with or posterior to Suśruta. Possibly the original Suśruta Sazahitā had been recast and the redactor could appropriately offer a salutation to the original author and to other surgeons who flourished before him. There is also an Indian medical tradition, noted in Dallanacarya's Commentary, which assigns the improved and supplemented edition of Suśruta's original work to Nāgārjjūna, z the celebrated Buddhist Chemist, who is said to have been a contemporary of the king Sātvāhana.

In the third chapter, Susruta enumerates the subjects described by him,—the chapter forming an index of the book. Therein he mentions the five principal divisions of his book and says that the Uttara Tantra or the Supplement would be

Suiruta Samhita, I.

Dallaņa's Commentary to Susruta, L. i.

See also Dr. Cordier's Recentes Decouvertes, pp. 12-13.

नमी ब्रह्मप्रवापलियवलभित्वलिस्युतप्रस्तिभ्यः।

अव यव परीचे नियीगस्तव तवैव प्रतिसंस्कर्णम् मूर्व ज्ञातव्यमिति। प्रतिसंस्कर्णपीकः नागार्ज्ञन एव ।

See Harsacarita by Vāṇa.
Beal's Buddhist Rocords of the Western World, Vol II., P. 209, 212, 216.
Burgess' Archeological Survey of S. India.
Introd. a l'histoire du Budh, Ind., P. 508.

described afterwards.¹ Now the fact that the sixth part was appended to the work as a Supplement or Uttara Tantra (i.e., after treatise) clearly shows that it was written afterwards by another surgeon and added to the original treatise. If the original Susruta wished to have six divisions of his book, he would have mentioned it clearly in the index and would not have, after stating that his book consisted of five parts, added that "the Supplement would be described afterwards," which seems to be an interpolation of the Supplementor to pass his edition as the original work of the author. Again at the end of the fifth section, there is a passage describing the importantce of the Ayurveda, which was meant as the conclusion of the book by the author. It is to be noted

बध्यायानां शतं विश्वमैत्रमेतदुदीरितम्। बतःपरं स्वनासेव तत्वमुत्तरमुखते॥

Suśruta Samhită, I. iii.

वीज चिकित्सितसेत्रतत् समासेन प्रकीर्त्ततम् । सविश्रमध्यायज्ञतमस्य व्याखा भविषाति ॥

तत्र सर्विश्रमध्यायशतं पश्चमु स्थानेषु । तत्र मृतस्थाननिदानशारीरचिकिन्सितकस्पे-व्यवकात् संविभन्योत्तरे तन्ते श्रेषानयान् व्याखायासामः ।

Ibid, I. i.

मित्रमस्यायश्वतमेतदुत्तं विभागमः।
इहीद्दिशनिद्दिशन्मश्रीन् वद्याम्यवीत्तरे॥
सनातनतादेदानामचरत्वामवेद च॥
तवा दृष्टफलताच इततादिप देहिनां।
बाक्समूहावेदिसारात् पूजितताच देहिभिः॥
चिकिभितात्पुख्यतमं न किचिदपि सुयुत।
चापेरिन्द्रप्रभावसाख्यत्योनिभिवगुरोः॥
धारविता तु विमलं मतम् प्रमस्यातं।
छताहार समाचारईह प्रेत्य च मीदते॥

Ibid, V. viii.

प्रामाभिहितं सर्विशमध्यायशतं पश्चमु स्थानेषु । तत्र स्वस्थानमध्यभ्याः पट्चलारिशत् । पीइश निदानानि । दश शारीराषि । चलारिशचिकित्सितानि । षटौ कल्पाः । तदुत्तरं षटपि ।

that at the end of no other sections do we find a similar passage. He also writes: "Thus one hundred and twenty chapters are described" but adds: "The other diseases shall be described in the Uttara Tantra": the latter part no doubt is an interpolation of the Supplementor. Moreover, in the opening lines which serve as a preface to the sixth part, the authority quoted for the diseases of the eye is Nimi, the king Janaka of Mithila and not Dhanvantari.1 But in the first chapter of the first section, it is described that the sages wanted Dhanvantari to teach them Salyatantra or Major Surgery only and he consented to their request. And this subject he treated in detail in the five sections of the book. In the Supplement, on the other hand, are described the other branches of the science such as Minor Surgery, Inner Medicine, &c. Probably this part was added afterwards to give completeness to the treatise; and the original Susruta was called Vrddhya or the Old by the commentators to distinguish him from the Supplementor.

Suśruta's work is specially important to us as having two whole chapters (vii and viii of Section I.) devoted to the descriptions of Surgical Instruments and one whole chapter (xxv of Section I.) to the principles of Surgical Operations.

The age of Suśruta is also involved in obscurity. Nothing can be ascertained from the fact that he was a son of Viśvāmitra²,

Suśruta Samhita, VI. i.

अध्ययानां मते विशे यदुक्तमस्त्रत्या। वत्यामि वृष्ट्या सत्यगृत्तर्रद्रयोगिमानिति ॥ ददानीनात् प्रवत्यामि तत्वसृत्तरसृत्तमः । निखित्रनीपदिखने यव रोगाः पृत्रविधाः ॥ आलाक्यशास्त्राभिदिता विदेशिधिपकीर्तिताः ॥

^{*} Viśvāmitra is the gotra name; so the simple name may either refer to the great Viśvāmitra or to his descendants.

for the age in which the latter lived is not known to us. But he must have flourished during the Vedic Age as many Vedic Hymns are ascribed to him. In the Mahābhārata, Suśruta is mentioned as one of the sons of Viśvāmitra1 and in the Suśruta Samhitā the author is often described as his son. The age of the great epic has, with good reasons, been fixed at 1000 B.C. So Suśruta must have flourished much earlier. The latest limit which we can assign to Suśruta is 600 B.C. as "there are indications in the Satapatha Brahmana, a secondary Vedic work, that the author of it was acquainted with the doctrines of Suśruta" as regards the Osteology. "The exact date of that work is not known, but it is with good reason referred to the sixth century B.C." Again in the Atharva Veda, in the tenth book, there is a hymn on the creation of man in which the skeleton is described according to Atreya and Suśruta.2 "The large portion of it (Books I to XVIII) indeed admittedly belongs to a much earlier period, possibly as early as about 1000 B.C.; and the hymn in question is included in this older portion"3. This shows that Susruta could not have flourished later than 1000 B.C.

Again in Hasti-Ayurveda, a book on the Treatment of

शामायनीऽय गार्थंय जावलिस्युतस्या—

विश्वामिताकाजाः सर्वे मुनयी ब्रह्मवादिनः॥

Mahābhārata, Anuśāṣana Parva, Ch. IV.

See J. R. A. S., 1906, P. 915; 1907, P. 1.

² Hoernle's Studies in the Medicine of Ancient India, Part I. Oeteology, Introduction, P. 9.

Elephants by Pālakāpya, we find the Surgical instruments described after the manner of Suśruta. Pālakāpya lived as a Veterinary Surgeon in the Court of Romapāda, King of Aúga, which had as its capital the famous town of Campā, identified with the modern town of Bhāgalpur. King Romapāda was contemporary with king Daśaratha, the father of Rāma, the hero of Rāmāyana. Here we have a corroborative evidence of the age of Suśruta.

Suśruta is mentioned in the Vārttikas of Kātyāyana² who flourished during the fourth century B.C.

We have alluded to Nāgārjjūna, the Buddhist Chemist, as the redactor of the Suśruta Sańhitā. He is said to have been a contemporary of king Kanişka that is about the first century B.C.

Another revision was undertaken by Candrațe, the son of Tīsaṭa, the author of Cikitsā-kalikā. He revised the text which must have fallen then into a state of corruption. The probable date of Candrațe is the ninth century A.D.4

भार्ति शत्रुवनाणस्य पितरै च वंशस्त्रिनस्। एतक्किचेवकाले तु रोमपाट प्रतापवान्।

Ramayana, Valakandam, Ch. IX.

See also Rāmāyana, i, 11, 13-20 ; Mahābhārat, iii, 110, 10008-9 ; Bhāgavat, ix, 23, 7-10.

² सुयुतेन प्रीतं सीयुतं।

³ Possibly more than one Nagarjjūna appeared in ancient India as a chemist. Albārūnī says: "He lived nearly a hundred years before our time" (India, I. P. 189). Rajtaranginī places him in the 3rd century n.c. (I. Vs. 172-173). The modern scholars are of opinion that the founder of the Mahā-yāna system lived in the first century a.p.

^{*} Hoernle's Osteology, p. 100,

There is no doubt of the tradition that Suśruta's work was redacted, for the author could not write such a passage as follows: "The surgical treatises of Aupadhenava, Aurabhra, Suśruta and Pouskalāvata from the basis of other treatises on the subject."

Commentators.2-

- Cakrapāṇidatta—Vānumati—1060 A.D.
- Gayadāsa— {Nyāya Candrikā }—11th century A.D.
- 3. Jejjaţācāryya.
- 4. Bhāskara.
- 5. Mādhava.
- 6. Bramhadeva.
- Dallanācāryya—Nibandha Samgraha—12th century A.D.
- 8. Ubhalta (Kashmir).

Editions.—Suśruta Samhitā has been edited by Madhusūdan Gupta, Calcutta, 1835; by J. Vidyāsāgar, 3rd Edition, Calcutta, 1889; by A. C. Kaviratna, Calcutta, 1888-95; by Prubhurām Jībanarām, Bombay, 1901; and by Vīrasvāmī, Madras.

This book has been translated into English in part only by U. C. Datta 1883, A. Chaṭṭopādhyāy 1891, Hoernle 1897, Calcutta, in the Bibliotheca Indica. It has been translated into Latin by Hessler and into German by Vullurs.

The book was translated into Arabic before the end of the eighth century A.D. It is called "Kitab-Shawshoon-al-Hindi"

कीपधनवमीरसं सीमुतं पीक्तलावतम्। श्रेषाचा श्रव्यतनाचा मृलाम्येतानि निर्दिशेत्॥

Suśruta Samhitā, I. iv.

 and also mentioned as "Kitab-i-Susrud" or Book Susruta by Ibn Abillsaibial. Rhazes often quotes Sarad as an authority in Surgery.¹

VAGBHATA I.

The next author of celebrity and whose work is still extant is Vägbhaṭa I or Vägbhaṭa the elder, the author of Aṣṭāṅga Saṅgraha (i.e., Compilation of the Octopartrite Science). In later times, a namesake of his, wrote another work called Aṣṭāṅga Hṛdaya Saṅhitā (or the best Compendium i.e., the Heart of the Octopartrite Science). In the Uttara Sthāna, Vāgbhaṭa the younger distinctly states that his Compendium is based on the Compilation of Vāgbhaṭa the elder.²

As regards the age of Vagbhaṭa the elder, there is the same uncertainty as with his predecessors. We are however sure that he is posterior to Caraka and Suśrata for he refers to these writers by name.

The chronological relation of the three early authors is described in a popular couplet that Ātreya, Suśruta and Vāgbhaṭa were the three great medical authors for the three Yugas—

Adam's Commentary on Paulus Æginetta, VI. lxi. *

षणा व्यवस्था विभाग्यानेन योऽणावस्य सम्बास्तराणिरातः । तकादन अफलनअसमुखमाणां प्रीतयंभितद्दितं पृथ्यीव तन्तम् ॥

Aşţanga Hrdaya Samhitā, Uttara Sthāna, Ch. XL, v. 82,

¹ "His next description is from an author named Sarad, whom he frequently quotes in other parts of his works".

^{*} By name, e.g. in Sangraha, Bombay ed., Vol. I, P. 246; Vol. II, P. 421. Again quoted from Caraka, Ibid., Vol. I, pp. 20, 93; Vol. II, pp. 212, 213, et passim; from Suśruta I, ibid, Vol. I. pp. 109, 121, 177, 247; Vol. II, p. 303, et passim. (Hoernle).

the Treta, Dvapara and Kali, respectively.1 They are known as the Vrddha Trayi or the Old Triad. This medical tradition goes much against the conclusion of Dr. Hoernle that Vagbhata I must have flourished early in the seventh century A.D. One of the reasons put forward by him is the fact, that "the Buddhist pilgrim I'Tsing, who resided ten years in the Nalanda University (in Bihar) from about 675-686 A.D., states in Records of Buddhist practices that the eight arts (i.e., the branches of medicine) formerly existed in eight books but lately a man epitomised them and made them on one bundle (or book)."2 Professor Jolly understands by it the Suśruta Samhitā while Dr. Hoernle points out with more reasons that it refers to Vāgbhaṭa I's work, the Aṣṭāṅga Saṅgraha (i.e., the Compilation of the Octopartrite Science) and rules out Susruta by the word "lately." 3 But the description that I'Tsing gives of the contents of the book does not warrant any reference to either. Moreover, he has not given any reason why Vāgbhaṭa II's book Aṣṭāṅga Hṛdaya Saṁhitā (the best Compendium of the Octopartrite Science) might not be alluded to by I'Tsing. Dr. Hoernle, however, rules him out by date for "he can not be placed earlier than the eightth century"-an assertion unsupported by any evidence whatsoever. All that he has proved is that "Accordingly it is probable that all these three medical writers (Mādhava, Dṛḍhatala and Vagbhata II) come in the period from the 7th to the

¹ See foot-note 3, P. 6.

^{*} I Tsing: Records of the Buddhist Religion, Transl. by Professor Takakusu, P. 128.

J. R. A. S., 1907, P. 413, Hoernle's Osteology, Introduction, P. 10—11.

9th century A.D.1 at no very great interval from one another," and this proof is based on the age of Vagbhata I as suggested by I'Tsing's remarks. Thus he has taken for granted what he is required to prove. He has shown that Susruta is anterior to Vāgbhata I; and Vāgbhata II is posterior to him. But in trying to prove that Vagbhata I lived in the seventh century he cannot assume that Vagbhata II lived in the eighth. Another evidence adduced in support of his conclusion is the fact that the non-medical version of the list of bones of the human body as contained in the Law-book of Yajnavalkya presupposes earlier uncorrupted forms of lists of bones both in Caraka and Suśruta, and "the corrupt recension, traditionally handed down, must have come into existence at a later date," that is to say, between the date of Yajñavalkya (350 A.D.) and Vagbhata I, the latter of whom is proved to have copied from the corrupt recensions of Caraka and Susruta. Thus the older recensions still existed in the fourth century A.D. and if we add to it the interval of time necessary for the texts to have fallen into a state of corruption, we get the early seventh century A.D. for Vagbhața I. But we must remember that there is nothing to prevent against the supposition that Vagbhața I lived before Yājňavalkya. There might have been two recensions of the texts available during Yājňavalkya's time, one corrupted and it might or might not have been the work of Vagbhata I and another the version which was availed of by the sage Yājñavalkya. And similar events have happened, as has been pointed out 1, Dr. Hoernle himself, in our own generation. Gangadhar's recension of Caraka is a corrupted form of the text,

while the recension given in Jībānanda's edition is the traditional text of Caraka. No critic would I think jump into the conclusion that Gaṅgādhar lived three or four centuries after Jībānanda. Again if it be true, as he contends, that Suśruta was redacted by Vāgbhaṭa I, we could easily imagine that Yājňavalkya copied his list bones from the original Suśruta and not from the redaction of Vāgbhaṭa I. So we see that the age assigned to Vāgbhaṭa I, or the seventh century a.b. can not be accepted as proved. Dr. Hoernle says: "It should, however, be understood that these conclusions regarding the date and authorship of Vāgbhaṭa I, are not put forward as established fact."

Let us recapitulate the objections that can be urged against the conclusion that Vāgbhaṭa I lived in the seventh century A.D.

- 1. Vāgbhaṭa I is believed by the Indian medical men to have flourished long before the Christian era. By some, he is connected with the court of Yudhiṣṭhira, but his name is nowhere mentioned in the Mahābhārata. Ātreya, Suśruta and Vāgbhaṭa are described as the Old Triad or Vṛddhya Trayī and they were the authorities for the Tretā, Dvāpara and Kali Yugas, respectively. It is curious to observe that Dr. Hoernle in arguing against the conclusion of Prof. Jolly that Suśruta is meant by I'Tsing, takes advantage of this Indian medical tradition that Suśruta flourished during pre-historic times, but does not mention the same tradition with regard to Vāgbhaṭa I, which goes against his own conclusion. On the other hand the same objection does not apply against Vāgbhaṭa II.
 - 2. The name of Vagbhata, I's book, Compendium of the

Octopartrite Science, no doubt, agrees very well with the description of I'Tsing that "lately a man collected them into one bundle." But Vāgbhaṭa II's book "The best Compendium of the Octopartrite Science" is equally suggestive, though Dr. Hoernle says: "it cannot prevail by the side of the more suggestive name of the rival work of Vāgbhaṭa the elder."

- 3. Again in arguing against Prof. Jolly, Dr. Hoernle has attached much importance to the word "lately" by which Susruta is ruled out by date. Admitting the validity of such reasoning, it does not follow that by the word "lately" I'Tsing meant any contemporary author or any one who preceded. him by a short period only. To comprehend the meaning of the sentence we must understand the word "lately" in connection with the word "formerly" used before.1 Now the sentence "The science of medicine formerly existed in eight books" no doubt refers to the division of Ayurveda into eight parts by Brahmā and to the treatises on the different branches of Medicine by Agnivesa, Susruta and others. These treatises are believed to be of remote antiquity, and so any later compilation may be spoken of as recent in comparision with the old treatises of unknown ages. Thus the word "lately" may refer either to Vagbhata I or Vagbhata II, but the latter author's claim to the honour becomes reasonable considering his decided posteriority to the former and so coming within the limit of the time suggested by the word "lately."
- 4. Again I'Tsing refers to a book which was recognised as the standard throughout India. This may refer either to

Vāgbhaṭa I or II. But if Vāgbhaṭa I's book occupied such a position at the time of I'Tsing, it becomes difficult to imagine why Vāgbhaṭa II should write another work principally based on the work of Vāgbhaṭa I after a lapse of a century or so. Moreover, we find at the present time, that Vāgbhaṭa II's book, Aṣṭāṅga Hṛdaya Saṃhitā, has a wider popularity than the book Astāṅga Saṃgraha of Vāgbhaṭa I. The former has been printed many times and is widely read by the students,—so much so Vāgbhaṭa is generally known as the author of Aṣṭāṅga Hṛdaya Saṃhitā.

- 5. Moreover, the Arabian physician Rhazes, who is said to have lived in the ninth century (882 a.d.) in treating of the property of ginger, the common plantain or musa and other drugs, quotes from an Indian writer, whom he calls Sindaxar or Sindicara. Royle says: "But in the article De Allio another Indian author is quoted, whom I have not been able yet to trace out—Ait Sindifar (in another place written "Dixit sindichar") indianus valet contra Ventositatem." This Sindicara is identified with Vāgbhaṭa II of Sindh who was in his time known as a second Caraka or Cara, the syllable "ka" making no difference, as in words like "bāla" and "bālaka," both meaning a child. We know that the Vāgbhaṭa's Aṣṭānga Ḥṛdaya Saṃhitā was one of the medical works translated by the order of Caliphs in the eighth century.
 - The translations of the Caraka, the Suśruta and the Vägbhaţa occur in the Thibetan Tanjur.⁴ "George Huth,⁵

Antiquity of Hindu Medicine, Page 38.

History of Aryan Medical Science, P. 196.

Zeit, deut. morg. Ges. 34, p. 465.

Jour. Asiatic Soc. XXXVIII. (1835).

Zeit, deut, morg, Ges, T. (LXIX, pp. 279—284).

who has recently critically examined the contents of the Tanjur, concludes that the most recent date at which it can be placed is the 8th century A.D."

So I cannot avoid the conclusion that of the three authors, Suśruta, Vāgbhaṭa I and II, to which I'Tsing's remarks may refer, the last has probably the best claims to that reference; and the date assigned to Vāgbhaṭa I may well suit Vāgbhaṭa II i.e., "as late as the early 7th century A.D.," and possibly still earlier. Again it is impossible for us to say whether I'Tsing's remarks may not appropriately refer to other authors whose works are lost to us.

Mention should also be made of the fact pointed out by Dr. Cordier that Vāgbhaṭa is mentioned in Rājtaraṅgiṇī and his date is fixed there as 1196-1218 A.D.4

But the name of Vāgbhaṭa does not occur in Stein's edition of Rāj, which is no doubt the most reliable, and so we can easily dismiss this view as untenable.

Editions.—Vāgbhaţa I's book Astānga Samgraha has been printed in Bombay.

Commentary.—Arunadatta—about 1220 A.D.

- P. C. Ray's History of Hindu Chemistry, Intro., P. XXIX.
- ² Hoernle's Osteology, Intro., p. 10.
- Dr. Kunte places him "at least as early as the second century before Christ," Vide his Intro. to Văgbhața's Aşţānga Hrdaya Sanhitā.
- सिंडगुप्रसुतः परमवीडी वागभटाचायः कारमीरनगरपति जयसिंडस्य प्रजापालन समये (खृः बादश शताच्द्राम्, शक १११६—४०) वर्त्तमाना पासीत्।
 - Quoted in Cordier's Vāgbhaṭa et L'Asṭāngahṛdaya Samhita, 1896.

See Intro. to the Vaidyakśabdasindhu by Kacirāja Umeścandra Gupta, 1894.

VĀGBHATA II.

The next great authority in Hindu medicine is Vägbhața II, son of Sinha Gupta, an inhabitant of Sindh. His work, Astānga Hṛdaya Samhitā, the author himself states, is based on the summary of Vāgbhaṭa the elder. In the first chapter of Sūtra Sthāna, he acknowledges the help he received from the works of Agniveśa, Hārīta, Bhela, and others. The fact that Caraka is not referred to here as one of the sources of Vāgbhaṭa II has been taken advantage of by some to prove the posteriority of Caraka. They conclude that Agniveśa and Suśruta wrote their works long before him, and the Agniveśa Tantra was not called by the name of, and in fact was not as yet edited by, Caraka, at the

भिषग्वरी वाभट इत्यमुनमें पितामही नामधरीऽचि यस्य मृतीऽभवत्तस्य चै सिंहगुप्तः तस्याप्यहम् सिन्धुम् जातजन्मा ॥

Aşţānga.

- Aştānga Hṛdaya Samhitā, Uttara Sthāna, Ch. XL, v. 82.
 See foot note 2, p. 18.
- त्रश्चा स्थलाऽऽयुधी वेदं प्रजापितमजियहत्। सीऽधिवनी ती सहसाचं सीऽचिप्रवादिकान्तुनीन्॥॥॥ तऽधिवेशादिकांको तु पृष्यक् तन्ताणि तेनिरे। तिस्वीऽतिविप्रकीर्णेन्यः प्रायः सारतरीवयः। क्रियतेऽटाङ्ग्वद्यं नातिसंविपविक्तरम्॥॥॥

Aşţānga Hṛdaya, Sūtra Sthāna, Ch. I.

"It would appear also that at the time Vagbhata lived, Agnivesha's work was not called by the name of Caraka, and Suśruta had also been written. Hence it follows that Caraka's edition of Agnivesa, that is the work now called Caraka, was probably edited after Suśruta had been written."

Dutt's Materia Medica of the Hindus, Intro., p. IX.

time Vagbhața II flourished. The argument is however not conclusive; it only shows that the Agnivesa Tantra was available to Vāgbhaṭa II in its original form. No definite results can be expected from this argumentum ex silentio. Again it may easily be imagined, and I think it is the right view of the question, that Caraka lived and edited Agnivesa's work long before Vagbhața, the reason of Caraka being not mentioned in Vagbhata's book, is the fact that Caraka did not usurp the authorship of Agnivesa Tantra but clearly states at the end of each chapter the real nature of his share in the authorship of his book in the following words :- "Here ends the chapter of Agnivesa Tantra as corrected and edited by Caraka," Many modern text books of medicine have been edited and improved, though the books are still called after the original authors. Moreover to make Caraka flourish after Vagbhata II would bring him to quite modern times.

We are however arguing on false premises. Though Caraka is not mentioned in the Sūtra Sthāna of Aṣṭāṅga Hṛdaya, his name occurs in the Uttara Sthāna.¹ So there can be no doubt that Caraka's edition of Agniveśa was current in India long before Vāgbhaṭa II wrote his Aṣṭāṅga Hṛdaya Saṃhitā,

े यदि चरकमधीते तद्भुवं सुनुतादि
प्रियानितगदानां नाममाचेऽपि वाद्यः ।
प्रय चरकविद्योनः प्रक्रियायामखिद्यः
किमिद्य खलु करोतु व्यधितानां वराकः ॥४८॥
च्यपिप्रयाति प्रीतियेन्युका चरकसुनुती ।
भेजाद्याः वितं न पठ्याने तस्मामुख्यः सुभाषितम् ॥५३॥

Аश्वेत्राष्ट्रव Hrdaya Samhita, (Ed. Vijayratna Sen),

Uttara Sthana, Ch. XI.

 Editions.—There are various editions of the book but the following are reliable:—

- By Dr. Anna Moreśvara Kunte, M.D., 2 vols., Bombay, 1880; 2nd Ed., 1891.
- 2. By Jībānanda Vidyāsāgara, Calcutta, 1882.
- By Vijayratna Sen Kaviranjana, Calcutta, 1885-90.
- 4. By Ganeś Sastri Tartevaidya, Bombay, 1888.
- In Sanskrit and Bengali, with the commentary of Arūnadatta by Vijayratna Sen Gupta, Calcutta, 1888.
- In Sanskrit and Guzrathi by Behicharlal Nathuram, Ahmedabad, 1889.
- In Sanskrit and Bengali by Kāliśa Cundra Sen Gupta, Calcutta, 1890-1892.
- In Sanskrit and Hindi by Pandit Robi Dutta, Bombay, 1890.
- In Sanskrit and Marathi by Ganes Kṛṣṇa Garde, Poona, 1891.
- In Sanskrit and Bengali by Kavirāja Binod Lāl Sen, Calcutta, 1891-1892.

Commentaries.1-

 Sarvānga Sundarī² by Arūnadatta, son of Mṛgānkadatta, 1220 A.D.

See Cordier's Vägbhaţa et L'Aşţāngahrdaya Samhitā, P. 6.

इति श्रीमृगाडदत्तपुत्र श्रीमदह्रणदत्तिवरिवतायां
 सर्वाडसन्दराख्यटीकायां * * * * *

- Āyurvedadaršayana (Dinacharyā Prakarana) by Hemadri or Kamadeva, Raja of Devagiri. It is available in parts only.
- Aşţāngahṛdayarddyota by Aśadhara Sallaxana.
- 4. Padārthacandrikā by Candracandana.
- Sańketamañjarī by Dāmodara.
- Aştānga Hṛdayatikā by Rāmanāth Vaidya.
- Vālaprobodhikā (Anonymous).
- 8. Hṛdayabodhikā
- 9. Pāthya.
- 10. Vāgbhaṭartha Kaumudī by Hari Kṛṣṇa Sen Mullick,
- Pradtpa by Jaśodānandan Sarkār, 1298 B.S.

VÄGBHATA III.

The author of Rasaratna Samuccaya in the Colophons at the end of each chapter identifies himself with Vāgbhaṭa II: "Here ends Book first (or so) of R.R.S. composed by Vāgbhaṭa, son of Simha Gupta, prince of physician." The salutation at the beginning of his book is strictly Buddhistic. The probable date of the book is "placed between the thirteenth and fourteenth centuries A.D." "The chemical knowledge, as revealed in Vāgbhaṭa is almost on a par with that in the Suśruta," whereas the R. R. S. indicates an advanced state of that science. He quotes Rasārṇava as a source of his information; he does not mention opium as a medicine, and the Firanga roga and its treatment find no place in his book.

¹ P. C. Rāy's History of Hindu Chemistry, Intro., p. li,

MĀDHAVAKARA.

He is the author of the famous work on Pathology or Nidana, His book was translated into Arabic by the order of Harun-Al-Rasid and so the most recent date that can be assigned to him is the seventh century A.D.1 Thakore Saheb of Gondal identifies him with Madhabacaryya, the celebrated author of Sarvadarsana Samgraha, the brother of Sayana, the commentator of the Vedas.2 I do not find any authority for such an assertion and here is an example of fallacious reasoning based simply on the identity of names. Madhabacarvya and Sayana lived in the twelfth century A.D. Mention should also be made of the view expressed by Dr. Hoernle as certain that Madhayakara, the author of Nidana and Vrnda Madhaba, the author of Siddhayoga are one and the same person. He holds that Vrnda is the real name, but he was known to the commentators as Madhava, for his melodious diction. There is no proof given of this opinion, and we have reasons for not accepting it. However as he does not treat of surgical instruments, his work is not important to us.

CAKRAPĀNIDATTA.

Cakrapānidatta or more commonly Cakradatta in a Colophon³ has given an account of himself in his book called

Jolly's Indian Medicine, ff. 5, 6, pp. 7-9.

⁹ History of Aryan Medical Science, Ch. II, p. 35.

तौङ्घिनाय रसत्रताधिकारिपात्र—
 नारायकस्य तनयः सुनयीऽन्तरङ्गात्।
 भानीरन प्रथितलीधवलीकुलीनः
 श्रीचक्रपाकिरिङ कर्न्युपदाधिकारी॥

Cikitsā Sāra Saṃgraha: "The author of this work is Śrī Cakrapāṇi who belongs to the family of Lodhravali; and who is the youngest brother of Vānu and the son of Nārāyaṇa, the superintendent of the kitchen of Nayapāla, the king of Gour." This book is arranged on the plan of Vṛnda in his Siddhayoga² which again follows closely as a companion volume to Mādhava's Nidāna. The age of Cakradatta is about 1060 A.D.; and Vṛnda must have flourished between Mādhava and Cakrapāṇi for he quotes the former while he is himself quoted by the latter. So the probable age of Vṛnda is the ninth century A.D. Besides being a celebrated author, Cakradatta wrote excellent commentaries of Caraka and Suśruta. His extant works are—

 Cikits\(\tilde{a}\) S\(\tilde{a}\)rangraha or Cakradatta. A treatise on Medicine.

यः सिहयीगिजिसिताधिकसिहयीगा— नवैव निचित्रति कैवलसुद्धरेदा। भद्भवयिषयवैद्दिदा जनेन दत्तः पतेन सपदि सुदैनि तस्य ज्ञापः॥

Sloka at the end of the Cakradatta.

य इत्वादी। — सिंडियीन इति इन्देशतसंग्रहस्य संज्ञा, तिक्ववित्यीगमपेच्याधिका ये च सिंडियीना चन संग्रहे उक्तासानधिकयोगान् तत्त्व सिंडियीने निचिपति, तथा यो वा तानधिकसिंडियोगानितः संग्रहादुद्धरेत् दूरीकुथात्, तस्य मृदंनि ईडिशन पुंसा दत्तः आपः पतित्। कौडेशन पुंसा मिड्नियविपयविद्विद्या। कारिका इन्हरीका चन्द्रटीकेति भड्नयं, विषयवेदः चरुयजुःसामक्ष्यः, तिहदा॥

Sibadāsa Sen's Commentary.

For the date of Nayapāla, vide Cunningham's Archoo. Survey of India. III. P. 119; also J. A. S. LX. Pt. I. P. 46. Life of Atisa by S. C. Däs.

इन्देन * * * * * * संलिप्यते गदविनिषयक्रमेन॥

- Cakradatta or Materia Medica. It treats on drugs applicable to a number of deseases.
- Muktābali. This treatise on the nature and properties of medicinal drugs is ascribed to Cakrapāṇi.
- 4. Vānumati—Commentary on Suśruta Samhitā.
- Cakratattwadīpikā—Commentary on Caraka Samhitā.

Editions .-

- Cakradatta or Cikitsā Sāra Saingraha edited by Kavirāja Pyāri Mohan Sen Gupta, Calcutta, 1295 B.S.
- Cakradatta with Bengali translation by Candrakumār Dās Kavibhuṣan.
- Cakradatta with Bengali translation and with commentary of Siva Dās Sen, by Jaśodā Nandan Sarkār, 1302 B.S.

SĀRANGADHARA.

He wrote Sārangadhara Sangraha. It is compiled from the works of Caraka, Suśruta, Vāgbhaṭa and others.¹ It is very popular in Western India. It treats on nosology and practice of Medicine. He was the son of Dāmodara and flourished in the fifteenth century A.D.

Edition.—By Kavirāja Pyāri Mohan Sen Gupta, Calcutta, 1296 B.S.

> प्रसिद्धयीगा सुनिभिः प्रयुक्ता विकित्सके ये वङ्गीऽनुम्ताः। विभीयते भाक धरेण तेषां ससंग्रहः सञ्चनरञ्जनाय॥

Commentary.—Sărangadharatîkā: It is a commentary on the above work by Adhamulla.

BHÁVA MIŚRA.

About 350 years ago, a compilation was made by Bhāva Miśra, son of Lataka Miśra, an inhabitant of Benares, from the most celebrated medical works and was called Bhāva Prakāśa.¹ He lived about 1550 A.D. and was considered a "Jewel of Physicians and Master of Śāstras." He mentions China root called Tob Chini² in the Vernacular as a remedy of Firanga roga or Syphilis⁵ which he describes for the first time in India. He was the first to make mention of certain drugs of foreign countries as Badhkshani Naspasi,

भणुर्वेदाश्चिमध्यादितिमतिमुनयी यीगरवानि यवा-लश्चा खे खे निवश्चेदप्रखिलजन व्यधिविश्चेमनाय । तत्तद यन्यादग्रहीतै: मुक्चनमांगिभ भौरमिद्यिकिका शास्त्रे जाद्याश्वकारं प्रश्नमियतिममं सन्विधते प्रकाशम् ॥ Bhava Prakāša, I. i.

द्रति वीमित्र लटकतनय श्रीमन्त्रित्रभावविरचिते भावप्रकाने पड प्रकरचं सम्पूर्चं ॥

Colophon at the end of Section I.

विवसाधानग्रलची कवितकीका विवदीप्तित्तन्। विवसाधानग्रलची कक्तन्यूचिकोधिनी॥ वातव्याधीनपक्षारमुन्यादं तनुवेदनाम्। व्यपीऽति विवेषेक किर कामयनाजिनी॥

Bhāva Prakāša, I. i.

फिरक्संत्रके देशे वाहुल्येनव यहवेत्। तस्मात् फिरक इत्युक्ती व्याधिव्याधिवशारकै: ॥

Bhāva Prakāfa, II. iv.

Kharjura (date fruit of Suleman), and opium.

Editions.—

- By Jibānanda Vidyāsāgara, Calcutta, 1875.
- 2. By Rasik Lal Gupta.
- By Kālīśa Candra Vidyāratna.

Besides these books, the number of Sanskrit medical works is simply legion; many of them are daubed with fancy names and are excellent treatises on the different branches of medical science. But they are quite foreign to our purpose. I intend to publish in a separate volume short notices of the medical authors and their works, and so we need not dwell on them here.

पारसीक यवानी तु यवानी सहजी गुणै:। विशेषात् पाचनी कचा गाहिची मादिनी गुक:॥

Bhāva Prakāša, L.

पारसीकवचा युका शीका हमवतीति सा। हैमबस्युदिता तददातं हन्ति विशेषतः॥

Ibid.

उतं खसफलचीरमापूकमहिपेणकम्।

Ibid.

चीनाक सन्नः कप्रदः कफचयकरः सृतः।

Ibid.

खर्जुरी गीमनाकारा परशीपादिचागता ॥

Ibid.

CHAPTER II.

HOSPITALS AND DISPENSARIES.

Before entering into our proper subject, it would not be amiss to notice here two objects—Hospitals and Anasthetics—which are essentially necessary for the devolopment of surgical knowledge. We know from the Edict II of Aśoka that India during his reign was studded with hospitals not only for the treatment of human beings but also for the brute creations. But even before Aśoka, hospitals flourished in India. In Caraka we can trace the germ of such an institution though it was used for rich men and did not accommodate the public.

ततः श्रीलशेचानुरागदा त्यप्रादिचक्षीपपन्नानुपचारकुशलान् सञ्चलक्षेसु पर्यवदातान् स्पीदनपाचकसापकसंवाहकोत्यापकसंवशको व्यप्यपेषका य परिचारकान् सञ्चलक्षेस्वप्रति कुलान्। तथा गीतवादिवील्लापकश्लीकगायास्याविकतिहास-पुराषकश्लानानिप्राय-शाननु-सतांच देशकालिदः परिषयांय। तथा लावकपिश्रलश्लश्लश्लिरके कालपुक्ककसगमात्की रसान्। गाव दोर्ग्यो श्लीलवतीमनातुरां जीवहत्सां सुप्रतिविहितत्वण्यरकपानोयाम्। जलपावाचमनीदकी हमिलकपिठरघटकुक्षीकु अकु स्वश्रात्वद्वीकपरीपचनमत्यानचेलस्वकापांसी वादीनि च श्रयनासनादीनि चीपन्यस्वश्राप्रतिवहालि सुप्रश्रात्वरक्षीक्षपरीपचनमत्यानचेलस्वकापांसी प्रधानानि स्वापाययानि संवश्रात्वरक्षिणकप्रदेशे परिषेकानुलपनवमनविद्वनास्थापनात्वासन-श्रिरीविर्वनम्बोधारकर्षाक्षासुपचारस्वानिसुपचालितीपयानावच श्रकासरम् स्थमा दश्रद श्रकाणि चीपकरणार्थान।

ष्मनेत्रं विजित्वचीत्तरविश्वच्छ । कुम्मस्य तृत्वाच मानभास्य इततेल्वसामञ्ज्ञोद्र-फाणितल्वकोश्वनीदक-मधुस्रासीवीरकतृषीदकमेर्यमेदकदिषमस्प्रोदिम्ब्रानासमृत्राणि च । तथा मालिविष्टकसुद्रमापयवितलकुलत्यवद्रसदीकापक्षकाभयामलकविभीतकानि नाना-विधानि च सेइस्वीदापकरणानि द्रव्याणि तथेवीदं इर्यानुत्वीमिकीभयभावि संग्रहनीयदीप-नोयपाचनीयीपमनीयवातइराणि समास्थातानि चौषधानि यक्षाम्यदिष किविद्यापदः परिसंकायीपकरणं विद्यते यह प्रतिभीगायं तत्तदुपकस्ययेत् ॥

<sup>इदं निवातं प्रवातिकदंशं सुखप्रविचारमनुपत्यकं धूमातपरजसामनभिगमनीयमनिटानाख

शक्त-स्पर्णरस-स्प-विधानां सोपानीट्रमलमुपलवर्षः स्वानसानम्मिमहानसीपतं वान्तुविधाक्रमलः प्रश्नसं स्टइमेव तावत् पूर्वमुपकलपयेतः।</sup>

He advises us as follows:-The engineer is to erect a strong and spacious building, well-ventilated at one part, the other part being free from draughts. The scenery should be pleasing and one should feel happy to walk in it. It must not be behind any high building, nor exposed to the glare of the sun. It should be inaccessible to smoke and dust. There must not be anything injurious to our senses as regards sound, touch, taste, form and smell. There should be stairs, large wooden mortars and pestles; and there must be additional bare ground for the construction of a privy, bath-room and kitchen. The staff should consist of servants and companions. The servants should be good, virtuous, pure, fond, clever, generous, well trained in nursing, skillful in works, able to cook rice and curries well, competent to administer a bath, expert masseur1, trained in raising and moving a patient, dexterous in making or cleaning beds, practiced in the art of compounding medicines and willing workers not likely to show displeasure to any order. The companions should be good singers and musicians, fluent speakers, well-versed in distichs, ballads, tales, history and mythology, well-acquainted with the design of a patient's nods or signals, agreeable and should have knowledge of the season and the locality. The various kinds of animals

स्टब्यश्चनकर्तारसल्पका व्ययकासया । प्रसाधका भीजनावच गावसंवादका चपि॥

From the accounts of Megasthenes, we learn that four attendants used to massage him (Candragupta) with ebony rollers during the time that he was engaged in disposing of cases. Such an attendant (samvāhaka) is a minor character in the Toy Cart or little Clay Cart, drama, transl. by Ryder, in Havard Oriental Series, Vol. IX, 1905—Smith's Early History of India, 2nd Ed., Page 122. Footnote. We also find in the Kāmandikya Nitisāra that the king is cautioned against shampooers who have the opportunity of poisioning him.

should always be kept in stock such as Lava (Perdix Chinensis), Kapinjala (partridge), hares, sheep and the different kinds of deers, Ena (the black antilope) blacktailed deer, and Mṛgamātṛka. There should be a diary attached to the building. The cow should be good natured and healthy, and should yield profuse milk. The calves must be living. There should be stocked for them potable water and hay in a clean fold. In that building must be kept the following necessary articles:—

Water vessels, washing basins, tubs, jars, dishes, ghata, (small jars) kumbhi, kumbha (larger and smaller vessels), kundu (jug or pitcher), soraba (earthen basins), spoons or ladles, cooking utensils, churning rods, cloth, thread, cotton, wool, bedding and asana (seats). Near them should be placed drinking vessels of gold and spittoons. The bedding should consist of a broad carpet, bed-sheet, pillows, and a bedstead. There should be collected good furnitures for beds and seats; and also utensils and appliances for application of oleaginous medicines, heat, oil, ointment, bath and perfumeries, and for the acts of emesis, purgation, draining of the brain, injection into the rectum, defaecation and urination (i.e. Vastiyantra, urinal, bed-pan &c.). The blunt and sharp instruments and their accessories, well-washed mullers and whetstones of different degrees of smoothness-polished, plain or roughshould be near at hand; the tubular instruments for fumigation, inhalation and injection into the rectum, urethra and vagina, should be available there; and the following articles are also to be stocked:-brushes and brooms, weighing scales and weights, ghee (melted butter), oil, fat, marrow, honey, molasses, salt, wood, water, spirituous liquor formed by steeping husked grains of barley in water, or by boiling together the husks of fried maskalaya

(pulse of Phaseolous Rox.), barley and water, spirituous liquor from the blossoms of Lythrum Fruticoscence with sugar, spirit distilled from the different sorts of grains, curdled milk, rice, gruel, whey, sour liquid produced from the aceteus fermentation of powdered paddy, and the various kinds of urines of animals, Different kinds of rice such as Sali (or that reaped in cold season) and Sasthika (or that grown in hot weather in low lands and reaped within sixty days of its sowing), Mudga (Phaseolus mungo), Māṣa (Phaseolus Rox.), Yava (Hordeum Vulgare), seasame (Seasamum Indicum), Kullatha (Dolichos Biflorus), plums (Zizyphus Jujube), raisins (Vitis Vinifera), Parusa (Grewia Asiatica), Abhayā (Chebulic Myrobolan), Amlaki (Phyllanthus Emblica), Vibhītaka (Terminalia Bellerica) and other classes of medicaments, as oils, diaphoretics, sternutatories, cathartics, emetics, purgatives, astringents, stomachies, digestives, calmatives, carminatives and various other forms of medicines, are required for treatment. Besides these, there must be stored the antidotes to poisons caused by overdoses of medicines and other appliances likely to add to the patient's comfort.

To this may be compared the description of the Greek intrium, which is mentioned in the Hippocratic treatise, De Medicio. He directs that "it should be so constructed that neither the wind nor sun might prove offensive to the patient, and goes on to enumerate the various articles which it should contain, such as scalpels, lancets, cupping-instruments, trepans, raspatories, with bandages and medicines." 1

Works of Hippocrates, Syd. Soc. Vol. II, page 470, Footnote.

Susrnta gives us a list of appliances¹ required in surgical operations:—

1. Blunt Instruments. 2. Sharp Instruments. 3. Potential Cautery. 4. Actual Cautery. 5. Śalākā or rods. 6. Horns. 7. Leeches. 8, Hollow bottle gourd. 9. Jāmbav-ouṣṭha [a bougie of blackstone, the extremity of which is shaped like the fruit of the Jambul tree (Urginea Jāmbolana)]. 10. Cotton. 11. Pieces of cloth. 12. Thread. 13. Leaves. 14. Materials of bandaging. 15. Honey. 16. Ghee, or clarified butter, 17. Suet. 18. Milk. 19. Oils. 20. Tarpan.—flour of any perched grain or condensed milk etc. mixed with water to mitigate thirst. 21. Decoctions. 22. Liniments. 23. Plasters. 24. Fan. 25. Cold and hot water. 26. Iron pans, kalasi and other earthen vessels; beddings and seats. 27. Obedient, steady and strong servants.

The Lying-in-room.—Caraka says: "Before the ninth month of pregnancy, the lying-in-room should be constructed. The land should be cleaned of bones, gravels and potsherds. The ground selected should be of auspicious colour, taste and smell. The gate of the house should face towards the east or the north."

There must be a store of wood such as Vilva (Ægle

Suśruta Samhita. I. v.

[े] चतीऽनामतं कथं चिकीयंता वेशेन पूर्णमेवीपकःपवितव्यानि तद्यवा यन्त्रमन्त्राराधि-मलाकाग्रक्रजलीकालान्त्रान्त्वीष्ठपिनुष्ठीतम् वपत्रपद्रमधूष्टतवसापयसेलतपंनकषायसेपन कल्क-व्यवनशीतीचीदक कटाइदीनि पारकसंगाध्य विक्याः स्थिरा वलवनः।

and flowers; its boundary should be of a quadrangular form, level and smooth, with a sloping declivity towards the east producing a hard sound, with a stream running from left to right, of an agreeable doour, fertile, of an uniform

Marmelos), Tinduka (Diospyros Embryopteris), Inguda (Balanites Rox.) Bhallākaka (Semecarpus Anacardium), Vāruna (Ocimum Basilicum), Khadira (Acacia Catechu) or wood of other kinds said to be auspicious by a Brāhman versed in the Atharvaveda; and there must be a sufficient provision for clothes, liniments, and covers. For the pregnant woman, be careful to have a fire-place, water, pestles and mortars, a privy, a bathing place, and ovens. These should be constructed according to the science of engineering and should be pleasant with regard to the season. There should be collected clarified butter, oil, honey, different kinds of salts as rock salt, sonchal salt, and, black salt, Vidangas (Embelic Ribes), treacle, Kustha (Saussurea Lappa), Kilima (Pinus Deodara), Nagara (dried root, of Zinziber Officinale), Pippali (Piper Longum), its root, Hastipippali (Scindaspus Officinalis), Mandukparni (Hydroctyle Asiatica), Elā (Elettarium Cardamomum), Lāngolī (Gloriosa Superba), Vāca (Acorus Calamus), Cavya (Piper Cava), Chitraka (Plumbago Zeylanicum), Chiravilva (Pongamia Glabra), Hingu (Ferrula Assafætida), Sarsapa (Mustard seeds), Lasuna (Allium Sativum), finely or thickly powdered rice, Kadamba (Anthocephalous Kadamba), Atasi (Linum Usitatissimum), Vallija (Cucurbita Pepo), Bhurya (Betula Bhojpatra), Kulatha Dolichos Uniflorus), Maireya (a spirituous liquor from the blossoms of Lythrum Frutecoscence) and Ashava (Vinous fermented liquor from sugar or molasses, Rum). Also clollect two pieces of

colour containing a great quantity of soil, producing water when dug to the height of a man's arm raised above his head, and situated in a climate of moderate temperature."

Manosara, Ch. I. quoted in Ram Raz's The Architecture of the Hindus, Page 16.

stone (muller and stone slabs), two pestles, two mortars, an ass, a bullock, two sharp needles of gold and silver, two skeins of threads, sharp instruments of steel, two wooden bedsteads (Ægle Marmelos), and wood (Tinduka and Ingudi) for easily igniting fire. The female attendants should be mothers of children, and friends and relatives of the patients. They must be fond of her, skillful in work, intelligent, jolly, laborious full of tender love for the children and a favourite of the mother."

The Child's Room:—He continues—"The engineer is to construct a room, spacious, beautiful, full of light, well-ventilated but free from draughts, strong, and free from beasts of prey, animals with fangs, mice and insects. There should be kept water, mortar and seperate places should be assigned for bathing, cooking, urination and deflecation. It should suit the season of the year. The beddings, seats and covers should be confortable and suitable to the season. Auspicious ceremonies should be performed in that room such as homa, expiations and presents to gods, for the proper protection of the child; and there should be present pious old men, doctors, and devoted

[े] प्राक् चैवासा नवमान्यासात् स्तिकागारं कारयेदपहतास्त्रिणकरां प्रमस्कार क्षरसम्भावां मृनो प्राग्डारमुदग्दारं वा। तव वेत्वानां काष्टानां तिन्दुकेहुदानां भक्षात-कानां वादणानं खदिरानां वा यानि चानान्यपि प्राक्षणाः प्रसिपुरच्ववंददिवदस्वस्मालेपनाद्यात्वापिधानसम्बद्धपं तत्। वास्तु-विद्या-इद्ययीगेनाप्रिसिल्लोलुखलववं स्थानसानम् मिन्दानस्यतुस्वच । तव सपिनेल्लमधुमैन्यवसीववं क्षालक्षणदिवद्वदिक्षप्रमूलि लयनकन्किनानोपातसीवित्वज्ञम् व्यां कुलत्यमेर्यस्यासवाः स्तिहिताः साः॥ त्याग्रामान्ति वे व्यान्यस्यत्वस्य वे व ज्वस्य सर्वे व तीच्याप्राप्तिः साः॥ त्याग्रामान्ति वे व्यान्यस्य विद्यान्यस्य स्यान्यस्य विद्यान्यस्य विद्यान्यस्य स्यान्यस्य स्यान्यस्य स्यानस्य स्

attendants constantly. The child's bed, covers and sheets should be soft, light, pure and scented. These should always be free from sweat, dirt, worms or bugs, urine and fieces. If repeated change of new clothes be impossible, the soiled coverings should be well washed and the beddings well purified with steam and thoroughly dried before they are used again. To purify or sterilise the dress, beddings, coverings and sheets by fumigation use the following medicines with clarified butter:—Barley (Hordeum Vulgare), mustard seeds, linseeds, assafætida, Guggula (Balsamodendron Mukul), Vāca (Acorus Calamus), Coraka (Andropogon Acicularis), Vayasthā (Chebulic Myrobolan), Golomi (Panicum Dactylon), Jațila (Nardostachys Jatamansi), Palankaṣā (a variety of Guggula), Aśoka (Saraca Indica), Rohint (Picrorrhiza Kurroa) and sankes' skin.....A variety of toys to please the child should be at hand and these should be coloured, light, musical, beautiful and must not be sharp pointed. They should be of such a size and shape as cannot be put into the childs' mouth or do not terrify or kill the child."1

भतोऽननारं जुनारागारविधिनतृव्याख्यास्यानः॥ वान्त्वियाकुमलः प्रमन्तं रक्षमतमकः निवातं प्रवातिकदंभं इदमपगतभ्वापदपयदंष्ट्रमृषिकपतः संविध्यक्षम् वर्षः स्वानक्षानम् सिम्हानस्यतुम्खं यथन् भयनासनासरणसम्प्रः कृष्येत्। तथा स्विहित्रः स्वानक्षानम् सिम्हानस्य प्रवाद्यातं यिष्ठ द्वयानुरक्षणन्यव्यानितः। कुमारागारविधिः॥ भयनासरणप्रावरणानि कुमारस्य सदुलग्रयिस्तग्वीनि स्यः। स्वेदस्वजन्तमनि मृषप्री-पिपस्थानि च वज्यानि स्यः॥ असति सभवेद्रभ्येषां तान्येव च सुप्रचालितपीधानानि सप्र्वितानि सुग्रवालाखप्रवरणानास्य प्रवस्त्रपत्रावरणानास्य प्रवस्त्रपत्रावरणानास्य प्रवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रव्यवस्त्रपत्रस्य स्वत्रवर्यस्य भार्ष्ययः। स्वत्रवर्यस्य स्वत्रवर्यस्यानां जीवतानि द्विणायी विषायस्योऽयाणि रहौतानि स्यः। सन्त्रायायीपधर्यी जीवकपंभकौ च यान्ययन्यानि नाम्रयाः। प्रशंसिदः। जीडनकानि स्ववस्य तु विचिणाणि घोषवन्यभिराः साणि प्रमृक्यतीलायानि कनास्यप्रविभीनि चप्राणहराणि भविवासनानि स्यः॥

Susruta directs that there should be a particular room provided for patients who have undergone surgical operations. Patients suffering from surgical diseases as inflammatory swelling, wounds &c. should, from the very commencement of their illness, confine themselves inside a clean house, situated in a wholesome locality, free from draughts and not exposed to the glare of the sun. For, in such a building, constitutional, mental and accidental diseases are not likely to occur. In that room, the bed for the patients should be soft, spacious, and well-arranged. The patient should lie down, his

मिनः प्रथमनेवागारमन्विच्छे त्रवागारं प्रभसवास्तादिकं कार्थे। प्रशस्त्रवासानिग्रहे गचावातपविक्रित । निवाते न च रोगाः साः भारीरागनामानसाः ॥ तिखन् श्यनमसन्वाधं सासीयं मनीजं प्राक्षिरकां सबस्यं कुर्वीत। सुखनेटापचार: स्रात् खासीचे श्रमे हरी। प्राचा दिशि स्तिता देवासतपुत्रायं नतं शिरः ॥ तिसन् सुष्ठहिरनुकुले: प्रियम्बदेरपास्यमानी ययेष्टमासीत्। समुदी विचिपन्याय कथाभितंशवंदनाः। बाध्वास्थली वहुम्बतुकुलाः प्रियम्बदाः ॥ न च दिवानिद्रावमनः स्रात । दिवासप्राइचे कल्जीवाणां गौरवं तथा । त्रयथुर्वे दनारागः सावयेव सम्मं भवेत् ॥ उत्वानसंवेजनपरिवर्णनचंक्रमणीचैभीपचादियु चात्रचंटाखप्रमत्ती व्रचं संरचेत्। कानासनं चंक्रमणं यानयानातिभाषणं। इसवात निधेवत शक्तिमानपि मानव: ॥ चत्यानायासनं स्वानं प्रया चातिनिधेविता । प्राप्त्यान्याकतादके कजनसाहिवळाँयेत ॥ मधावाच स्त्रीयां सन्दर्भन्मसभाषणसंस्पर्भनानिदूरतः परिचरेत्।

head pointing towards the east, and keep there some weapon for his own protection. On such a bed, the patient can lie comfortably and turn to his sides at pleasure. He should be surrounded by his dear friends, for their sweet words relieve the pain of inflammation. The female friends, however, should be avoided and kept at a distance. He should observe strictly the orders of the surgeon as regards his food, drink and mode of living. He should have his hairs clipped and nails pared short, be pure in his person, put on white clothes and devote himself to religious duties. A light should be kept burning; and garlands of flower, weapons &c., should be provided in the room to ward off the demons. He should be cheered and inspired by pleasant stories; and the physicians and the priests should attend the patient morning and evening. Pastils made of Sinapis Nigra and Azadirachta Indica with clarified butter and salt, should be burnt in the room morning and evening for ten days continually. The inflamed part should be fanned with a camar or yolk-tail. Sleep during the day, exercise and sexual intercourse must on no account be indulged in."

Susruta also describes the kitchen of the king thus:—
"That is the proper kitchen which is built on good ground, towards an auspicious quarter, full of utensils for cooking, spacious, clean, provided with windows guarded by a network, frequented by friends, cleared well of grass furnished with a canopy, purified by auspicious ceremonies, and managed by men and women of good character. The superintendent of the kitchen should, like the doctor, be noble and virtuous. The cook and servants should be pure, noble, capable, mild, good looking, engaged in their respective duties, high-minded, should have their hairs and nails cut short, steady,

well-bathed, of subdued passion, well-dressed, obedient and have their heads well-covered."

"The doctor in charge of the kitchen should be of noble family, religious, friendly, a clever manager for getting king's food properly prepared, ever careful for his health, non-avaricious, simple, fond, grateful, good-looking, cool-tempered, well-behaved, not proud and envious, laborious, of subdued passion, forgiving, pure, of good character, kind, intelligent, not easily fatigued, always loving, well wisher, capable, bold, clever, skillful, not unreasonably tender, provided with medicines and well proficient in the art of healing."

कुलीनं धार्मिकं बिग्धं सुधतं सततीत्वितं। चलकं चमरं भनं जतवं प्रियदर्शनं ॥ कीधपारुवमात्मर्वं मदालमा विवर्ज्जितं । जितेन्द्रियं चमावनां ग्रचिं शीलदयान्तितं ॥ मिधाविनमसंयानामन्रका हितेयां। पट प्रगत्मं निप्षं दत्तं मायाविविक्तंतं॥ पृद्धीतीय गुर्वेय ता निला सित्रहितागदं। महानसे प्रयुक्षीत वैदा तिहदाप् जितं॥ प्रमसदिगर्दशकते ग्रचिभाग्तं सहक्त चि। स्वालकं गवाचाटा मात्मवर्ग निपेवितं ॥ विकचसप्टसंसप्टं सवितानं कतार्धनं। परीचित स्तीपुरुषं भवेशापि महानसं॥ तवाध्यसं नियुषीत प्रायी वैद्यगुणानितं। मचयी दिचया दचा: विनाता: प्रियदर्शना: ॥ सविभक्ताः समन्मी नीच विश्वनखाः स्थिराः । खाताहड: संयमिन: हातीणीया: ससंयता: ॥ तस्याचात्रा विधेयासा विविधाः परिकक्तिंगः। बाहारस्थित यहापि भवनि प्राश्चिनी यतः ॥ तकात्मचानमे वेदाः प्रमाद रचिती भवेत । माधानसिक वीटार: सीपीटनिक पीपिका: ॥ भवेयदे वावधारा ये चापाने तु वीचन। इदितडी मनुषामां वाकचेटमुखवेहते: ॥

In the Kāmandakiya Nītisāra, we find the king advised to take thoroughly examined food, and to be surrounded by physicians well-versed in the science of Toxicology; and again it is said that king should take his medicines, cordials, and edibles after having his medical attendants tasted them. The king is advised to kill his enemy by weaning over his physician or by administering poisonous liquids.

In the Mahāvāgga* we find the qualities of a good patient and a good nurse described:—

"6. What are five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon—

When he does do what is good for him; when he does know the limit (of the quantity of the food) that is good for him; when he does take his medicine, when he does let a nurse who desires his good, know what manner of disease he has, or when he is getting worse that that is so, or when it is getting better that that is so; and when he has become able to bear bodily pains that are severe, sharp, grievous, disagreeable, unpleasant and destructive to life. These are the five qualities, O Bhikkhus, which when a sickman has, he is easy to wait upon.

Mahāvāgga viii, 26, 6 & 8 (Sacred Books of the East).

8. There are five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task—when he is capable of prescribing medicines; when he does know what (diet) is good and what is not good for the patient, serving what is good and not serving what is not good for him; when he does wait upon the sick out of love, and not out of greed; when he does not revolt from removing evacuation, saliva or vomit; when he is capable of teaching, inciting, arousing and gladdening the patient with religious discourses. These are the five qualities, O Bhikkhus, which, when one who waits upon the sick has, he is competent to the task."

There is also good deal of evidence to show that medicines were distributed free to the poor and to the pious men. When Visakhā asked for eight boons of the Buddha, she mentioned amongst them the previlege of bestowing her life long "food for the sick, food for those who wait upon the sick and medicines for the sick" and explained her reasons as follows.

"9. Moreover, Lord, if a sick Bhikkhu does not obtain suitable foods, his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the diet that I shall have provided for the sick neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha my life long with diet for the sick.

Moreover, Lord, a Bhikkhu who is waiting upon the sick if he has to seek out food for himself, may bring in the food (to the invalid) when the sun is already far on his course, and he will lose the opportunity of taking his food. But when he has partaken of the food I shall have provided for those who wait upon the sick, he will bring in food to the invalid in due time and he will not lose the opportunity of taking his food. It was this circumstances, Lord, that I had in view in desiring to provide the Samgha my life long with food for those who wait upon the sick.

10. Moreover, Lord it a sick Bhikkhu does not obtain suitable medicines his sickness may increase upon him, or he may die. But if a Bhikkhu have taken the medicines which I shall have provided for the sick, neither will his sickness increase upon him, nor will he die. It was this circumstance, Lord, that I had in view in desiring to provide the Samgha, my life long with medicines for the sick."

The Edict No. II of Asoka clearly shows that charitable institutions were common in India, during his reign. The Edict runs as follows:—

"Everywhere in the kingdom of the king Piyadasi, beloved of the gods, and also of the nations who live in the frontiers such as the Cholas, the Pandyas, the realms of Satyaputra and Keralaputra, as far as Tambapani, (and in the kingdom of) Antiochus, king of the Greeks and of the kings who are his neighbours, everywhere the king Piyadasi, beloved of the gods, has provided medicines of two sorts, medicines for men and medicines for animals. Wherever plants useful either for men or for animals were wanting they have been imported and planted. Wherever roots and fruits were wanting, they have been imported and planted. And along public roads, wells have been dug for the use of animals and men."

We also learn from Houen Tsang's account that Silāditya II

(610 - 650 A. D.) was inclined towards Budhism and he forbade the slaughter of living animals, built stupas, and "in all the highways of the towns and villages throughout India, he erected hospices, provided with food and drink, and stationed there physicians with medicines for travellers and poor persons round about, to be given without any stint."

He also mentions about the father of the Bhikkhu Śrutavimśatikoţi, that "from his house to the snowy mountains, he had established a succession of rest-houses, from which his servants continually went from one to the other. Whatever valuable medicines were wanted, they communicated the same to each other in order, and so procured them without loss of time, so rich was this family."²

He also mentions charitable institutions called Punyaśālās as common in India. "There were formerly in this country (Tsch-kia-Takka) many houses of charity (goodness or hppiness, Punyaśālās) for keeping the poor and the unfortunate. They provided for them medicines and food, clothing and necessaries; so that travellers were never badly off."

Again he says: "Benevolent kings have founded here (Mo-ti-pil-lo or Matipura) a house of "merit" (Punyaśālās). This foundation is endowed with funds for providing choice food and medicines to bestow in charity on widows and bereaved persons, on orphans and the destitute." A similar Punyaśālā or hospice was in K'ei-P'an-to (Kabandha). In describing

^{*} Beal's Record, Vol. I, p. 214.

^{*} Ibid, Vol. II, p. 188.

^{*} Ibid, Vol. I, p. 165.

^{*} Ibid, Vol. I, p. 198.

^{*} Ibid, Vol. II, p. 303.

Multan he says: "They have founded a house of mercy (happiness), in which they provide food, and drink, and medicines for the poor, and sick, affording succour and sustenance."1 Of Silāditya he says : "Every year he assembled the Sramanas from all countries, and on the third and seventh days he bestowed on them in charity four kinds of Alms (viz.-food, drink, medicine, clothing)."2

Fa Hian (405-11 A.D.), a contemporary of Candragupta Vikramāditya, describes the charitable dispensaries in the town of Pataliputra thus: - The nobles and householders of this country have founded hospitals within the city to which the poor of all countries, the destitute, cripple and the diseased may repair. They receive every kind of requisite help gratuitously. Physicians inspect their diseases, and according to their cases order them food and drink, medicines or decoctions, every thing in fact that may contribute to their ease. When cured, -they depart at their convenience," Smith remarks: "No such foundation was to be seen elsewhere in the world at this date; and its existence, anticipating the deeds of modern Christian charity, speaks well both for the character of the citizens who endowed it, and for the genius of the great Asoka whose teaching still bore such wholesome fruit many centuries after his decease. The earliest hospital in Europe the Maison Dieu of Paris, is said to have been opened in the 7th centuries."4

"Upatisso, son of Buddha Das, builds Hospitals for cripples,

Beal's Record, Vol. II, p. 274.

⁹ Ibid, Vol. I, p. 214.

^{*} Ibid, Vol. I, Intro. loii.

Smith's Early History of India, 2nd Ed., p. 280.

for pregnant women, and for the blind and diseased. Dhatushena builds Hospitals for cripples and sick". Buddha Das himself ordained a physician for every ten villages on the high road, and built assylums for the crippled, defermed and destitute."4

The animal Hospitals or Pinjrapoles which still exist at Ahmedabad, Surat, and Sodepore in Bengal, and elsewhere may be regarded as the survivals of the institutions founded by the Maurya monarch. The following account of the Surat Hospital in the 18th century is from the pen of Hamilton:-

"The most remarkable institution in Surat is the Banyan Hospital, of which we have no discription more recent than 1780. It then consisted of a large piece of ground enclosed by high walls, and sub-divided into several courts or yards for the accommodation of animals. In sickness they were attended with the greatest care, and here, found a peaceful assylum for the infirmities of old age.

"When an animal broke a limb, or was otherwise disabled, his owner brought him to the Hospital, when he was received without regard to the caste or nation of his master. In 1772 this hospital contained horse, mules, oxen, sheep, goats, monkies, poultry, pigeons, and variety of birds; and also an aged tortoise, which was known to have been there seventy-five years. The most extraordinary ward was that appropriated for rats, mice, bugs, and other noxious vermins for whom suitable food was provided."s

Crooke. Things Indian, Art. Pinjrapole, (Murray 1906).

Mahāwanio, p. 249. 2 Ibid, p. 245.

Cunningham's Bhilsa Topes, p. 54, foot note. ² Ibid, p. 256. ^a Hamilton's Description of Hindustan (120) Vol. 1, p. 718, quarto ed.,

We quote here from Hemādri the opinions of the sages and the Purāṇas as to the merit of the founder of a hospital¹:—

Visvamitra.

There is no gift more precious than the gift of cure; therefore it should be given freely to the sick to augment one's good fortune. He who gives medicines, diet, food, oil for smearing and shelter to the sick, becomes free from all diseases.

Samvartta.

The giver of medicines, oleaginous remedies and food for the cure of the sick, becomes free from all diseases, happy and long-lived.

Agastya.

Those who give rice and medicines freely attain happiness, being free from desease.

Saura Purana.

He, who gives medicines to the sick to cure their diseases always remains healthy, long-lived and happy.

े अय आरोग्यदानं।

तवारीम्यदानमाव दुचते।

ग्राइ विश्वामित्रः।

भारीन्यदानात्परमं न दानं विद्यते कचित्। भतीदेयं कजार्शानामारीन्यं भान्यवृत्वये ॥ भीष्यं पष्यमाद्यारं तैलाभ्यद्रप्रतिवयं। यः प्रयक्ति रीगिभ्यः सभवेत्राधिवर्जितः॥

संवर्तः।

चीपधं सेंह-माहारं रोगियां रोगमान्त्ये। ददानी रोगरहित: सुसी दीर्घायुरिन च॥

8860

2.3

Nandi Purana

The high-souled man who gives the Brahmins collyrium in charity to cure the diseases of the eye, goes to the Sun (after death) and becomes free from eye deseases, fine-looking and fortunate.

Good health is a step to the acquirement of religious merit, wealth, pleasure and final emancipation, and so the man who bestows cure to the sick and also he who erects a hospital equipped with good medicaments, dresses, learned doctors, servants and rooms for students, always gain them. The doctor should be well-versed in the religious treatises, experienced, familiar with the actions of medicines, a discriminator of the colour of the roots of the herbals and well-acquainted with the

चगस्य:।

भन्नी-यधप्रदातारः सुखं यान्ति निरामयाः।

सीर पुराणे।

रीगिषी रीगमान्यर्थमीयधं यः प्रयक्ति। रीगहीनः स दीवीयुः सुखी भवति सर्वदा॥

नन्दि पुराणे।

भवनं यी नरीदयादचीव्याधिनिहत्त्वे। विप्राय स पुनान् याति स्थेखीकं महानति:। भारीस्यनयनौ दिव्यः सुभगी जायते नरः॥

तिस्मनेव पुराणे।

धर्मा-य-काम-मीचाचा चारीन्यं साधनेयुतः। चतन्तारीन्यदानेन नरी भवति सर्वदा॥ चारीन्यमाचा कुरते महीषधपरिकदा। विद्यावेद्यसंयुका सत्यावस्यसंयुता॥ proper season of raising them from the ground, well-trained with the qualities of the juices, (their strength and actions), sali rice, meat and medicaments, trained in compounding medicines, one who knows well of the physique of men by intelligence, one who knows the temparament and the qualities of the diet, a pathologist who is not idle, well acquainted with the remedial agents for the premonitary signs and sequelæ of diseases, proficient in the requirements of time and place, well-read in the medical text-books—the Ayurveda with its eight divisions and an expert in curing diseases by domestic remedies (prepared from handful of common ingredients).

The pious man who erects such a hospital in which the services of good physicians of this nature are retained, becomes celebrated as the virtuous, the successful and the intelligent

> वैषम् श्राम्वित् प्राश्ची दृशीषधपराक्षमः । भौषधीमृत्ववर्णश्चः समुदर्णकालित् ॥ रस्वीर्ण्यविपाकशः श्चालिमसिषधीमणे । सीमविद्देशिनां देशं सी धिया प्रविशेदुधः ॥ धातुपध्यमयश्चय निदानविद्वनिद्वतः । ध्याधीनां पूर्व्यलिकश्चसदुत्तरविधानवित् ॥ दृशकालविधानश्चितित्साशास्त्रवित्त् ॥ भ्रष्टाकार्युवेदवेता सुद्धियोगविधानवित् ॥

अष्टावङ्गानि चायुर्वेदस्य ।

यवाश्रत्यं शालाकां कायचिकित्सा भृतिवया कौमारश्रत्यभगदतन्त रसायणतन्त वाजी-करणतन्त्रमिति सुयुतीकानि ।

एवं विष: यभी वैधी भवेदावाभियीजित:।
भारीस्यशालामवन् कुळादीषमंसंदयः॥
स पुमान् धार्मिकी लीके स क्षतार्थः सबुदिमान्।
सम्यगारीस्यशालायामीष्येः सेइपाचनः॥

man in this world. If in such a hospital the kind-hearted man can cure a single patient of his maladies by simple medicines, oleaginous remedies and compounds of medicinal decoctions, goes to the Brahma's residence with his seven generations upwards. The rich and the poor acquire religious merit in proportion to the amount of riches they possess; where would the poor man get a hospital and a young physician to cure his diseases? The man secures the eternal regions mentioned before by rendering the sick healthy by the use of roots to some and by good rubbing (with external applications) to others. He who cures the sick suffering from an increase or decrease of the Air, the Bile and the Phlegm by simple remedies, he too goes to such blessed regions (after death) as are secured by those who perform many religious sacrifices (Yajñas).

व्याधिनं विक्जी क्रत्य अप्येकं क्रम्भायुतः ।
प्रयाति व्रक्षस्टर्न कुलस्प्रकसंयुतः ॥
प्राक्षी विचानुसारेण दरिद्रः फलमान् भवेत् ।
दरिद्रस्य कुतः प्राला चारीन्याय भिष्ययुवा ॥
चिप्तमृत्रेन केनापि महनार्यरयापि वा ।
स्वस्थीकृति भवेन्यन्तां पूर्व्योतं लीकमव्ययं ॥
वातः पित्त-कफायानां चया-पचयभेदिनां ।
यन्तु स्वलामुपायेन मीचयेत् व्याधिपीडितान् ॥
सीपि याति यभान् लीकान् चवायान् यज्ञयाजिभिः ।

स्कन्दपुराणे।

षारीम्य शालां यः कृयात् महावैद्यपुरस्तृता । सर्व्यापकरणीपेतां तस्य पुख्यकलं यणु ॥ धक्यां च काम मीचाणामारीम्य साधनं यतः। तस्त्रादारीम्य दानेन तह्नं स्यावतृष्ट्यं ॥ ष्यवैक्षमार्भं विश्वां सम्बीकृत्य प्रयवतः। प्राप्नीति सुमहतन्युख्यमननं चयवजितं ॥ ज्ञानयीगरतं शालं रीगार्गं जित्यीगिनं। यः स्वस्यं कृषते सीपि सन्दानपत्नं लगेत्॥

Skandapurana.

Hear, the amount of religious merit secured by a man who erects a hospital containing all the necessary articles (of treatment) and in which are engaged eminent physicians by reward. As good health is the means of attaining religious merit, wealth, pleasure and final emancipation, therefore, he by rendering the sick healthy, gives these four blessings.

By carefully curing a learned man of his sickness great merit is secured, which is eternal and indestructible. He too who cures a sickman who is calm and absorbed in meditation of Siva and knowledge, attains the virtue of all kinds of gifts. Bramhā, Vishu, all the gods, diseases, relatives and kings—they are obstacles to yoga but not to those who perform it (yogi). Whatever merit is obtained by the great, by supporting the sick Brāhmans (priests), Kshatriyas (warriors), and Bith (cultivators) and Sudras (servants), can not be obtained by the performance of all the great Yajñas (religious ceremonies). As even the gods can not reach the end of the

त्रक्षा विष्यः सुराः सब्वे व्याघयः स्वजना रूपाः । योगस्येते मधाविप्रा व्याधयसे न योगिनां ० ॥ त्रक्ष-चित्रयं विद्-यद्भान् रोगाणांन् परिपाच्य च । यपुर्धः मध्दाप्रीति न तक्ष्वेमंधामस्यः ॥ भाकाणस्य यया नातः सुरैरप्युपलभ्यते । तत्रदारोग्यदानस्य नातीवे विदाते सचित् ॥ पुष्येनानेन मध्ता गता शिवपुरं नरः । मोदते विविधेभाँगैव्यिमानेः सर्वकामिकः । एकविंगत् कुलीपेतः सम्ब्यः परिपालितः । भासे शिवपुरे तावद्मावदाङ्गतसंत्रवं ॥ ततः स्वध्यंभिष्य संप्राप्तः प्रयतः सद्मा । ज्ञानमुष्यदाते तस्य स्ट्रेभः परिचारकः॥

स्वेन यीगिनामिति वा पाठ:।

firmament, so there is no end (to the merit) of the gift of cure. By this great merit, the man reaching the region of Siva enjoys himself by soaring in a balloon which can go to the various desired directions. With his twenty-one generations upwards and surrounded by his servants, he stays in the Siva's realm so long till deluge does not occur. There, after the lapse of his merit, the devoted servant acquires knowledge from Siva.

Abandoning this world by knowledge, abiding by the prayers to Siva, and casting away this body as a straw, he reaches beyond the limits of sorrow. Being freed from all sorrows, becoming pure, all-knowing and self-sufficient, and absorbed in his ownself, they are called the Liberated. Therefore to mitigate the diseases, the sick should be well nursed; the great sages should especially be attended to even by the sacrifice of one's body or riches. The wise must not irritate the weak patients, and they like the preceptors should be rescued constantly from sins. He who relieves the sick, by taking them under his care, reaches the other bank of this ocean of world.

ज्ञानादिरकः संसाराच्छिवध्यानसुपायितः।
स्वदेषं व्यवनाज्ञा सकंदुःखाननापुयात्॥
समसदःखनिन्केकः यदः स्वावध्यवस्तितः।
सकंदः परिपूर्णव सुक्त दलसिषीयते॥
तक्षाडोगापवर्गावं शीगानं ससुपाचरित्।
विशेषेण तृ यीगीन्दं शरीरिण धनेन च॥
रीगिणी नीदिजीत् प्राज्ञी दुक्कंजानिप सकंदा।
तान् पापाह् द्ववित्वसिवस्यः प्रवर्णते॥
योत्रस्हीतमाकानं सन्यमानी दिने दिने।
सपसप्त रीगानं सीर्णस्तेन सवार्णवः॥

इत्यारोग्यदानं।

Hemādri's Cāturvarga, Cintāmoni, Dāna Khandam. Asiatic Soc, Ed. Ch. XIII. P. 891—95. After these proofs, the statement of Mr. Ameer Ali that "the Arabs invented chemical pharmacy, and were the founders of those institutions which are now called dispensaries" can not be accepted as correct.

DISPENSARIES.

As regards dispensaries, Susruta advises the physician to construct his dispensary in a clean locality; and the building should face towards some auspicious direction as the east or the north. He says:—"The medicines should be kept in burnt earthen pots arranged on planks supported by stakes or pins". This is still the method of storing medicines used by the Kavirājas. Dallvaṇa explains the passage thus:—"The medicines should be kept in pieces of cloth, earthen pots, wooden pots and Śańku (kīlaka)."

The former explanation is plausible for it is impossible to imagine how a kīlaka or stake can be a container of medicine, unless it is implied as a point of support for hanging the medicine vials from it.

Dr. Heyne (1814) thus describes the ancient dispensaries of the Hindus: "The place in which medicines are kept should

Sufruta Samhita, L. xxxvii.

¹ History of the Saracens p. 262, 1899.

भ्रोतसङ्गाराजनकामबुविन्यसभिष्ठनं
 भ्रमकायां दिशि याची भेषनागारमिष्यते ॥

गरहीतीषघसंख्यापनीपायं दर्णयन्नाहः,—शीतित । शीतः कर्पटखर्खः, खदा भाखः, सत्भावः । फँवकः पहकः इति पुस्तकान्तरे पाठः, शहुः कौलकः, एतेषु शीतादिषु विन्त्रसः । ध्रतं भेषजः यक्तिन् राहे तत् भेषजागारं भेषजरहिमध्यते इति सन्वन्धः । प्रश्नायां दिशि पूर्वस्थामुत्तरस्यां वा, यची देशे अधिन् भूमिप्रविभागीयाध्याये, निवन्धेषु व्यव्ययेन न पाठी हम्मते । अध्याभिन्तु इद्यक्रसरौत्येव पाठी लिखित इति सर्व्याययवसाध्येष्वित्यादि यावन्नवं द्रव्यं पुराषचिति पाठं केचिदाचार्या न पठिन्त ॥

be clean, dry, and not accessible to rats, white ants or dust. The drugs ought to be put in nets, or large pots, the mouth of which must be tied over with a piece of cloth, and suspended in a room. Fire, smoke and water must be kept at a distance.

The house in which medicines are stored, should be neither in too high nor too low a situation, and it should not be far distant from places in which medicines may be collected. Its front should face either the south or the north, with a convenient *viranda* before the door of the same side.

The necessary apparatus for mortars, scales, &c., must be kept in a place in the wall that has been consecrated for that purpose by religious ceremonies."

After describing the different classes, and members composing each class, of medicines, Susruta continues: "The wise physician should collect and classify these medicines, and with them prepare external applications, infusions, oils, ghee, syrups, &c., as required for derangement of a particular humour. The medicines should be carefully preserved in all seasons, in rooms free from smoke, rain, wind and dust. The medicines should be used singly, or in combinations of several medicines of a class, or of an entire group, or of more than one group, according to the nature of the disease, and the extent of derangement of the humours."

पिमले पान् कषायां च तेलं सपी पिपानकान्। प्रविभव्य यथानायं कुर्वीत मितमान् भिषक्॥ धूमवर्षानिलाले दे: सर्व्यमुं वनिभद्रते। साइयिता रुडे न्यस्यैविधिनोषधसंग्रहं॥ समौद्य दोषभेदा अपान् भिन्नान् प्रयोजयेत्। प्रयक्षित्रास्य समसान् वा गर्यं वा व्यससङ्तं॥

ANÆSTHETICS.

In the medical text books of the Hindus, there is no mention of a general anæsthetic, from which we can infer that it was unknown in those ancient days. There are, however, many indications to show that the earlier surgeons felt the necessity of such an agent to produce insensibility to pain. Both Caraka and Susruta mention the use of wine to produce the desired effect. Caraka says: "After extraction of a dead fretus before the full term of pregnancy, wine should be prescribed to her, for that will improve the condition of her uterus, make her happy and alleviate the pain of the operation." Susruta, however, distinctly lays down that "wine should be used before operation to produce insensibility to pain." He again remarks: "It is desirable that the patient should be fed before being operated on. Those who are addicted to drink and those who cannot bear pain, should be made to drink some strong beverage. The patient, who has been fed, does not faint, and he who is rendered intoxicated, does not feel the pain of the operation."2

The use of certain drugs to produce anæsthetic effects was well known to the ancient Greeks and Romans. Dioscorides

Caraka Samhitā, IV, viii.

व्ययगतगर्भश्रक्तान्तु स्वियमामगर्भी मुराशीध्वनरिष्टमधुमदिरासवानामन्यतममग्रे सामध्येतः पाययत गर्भकीष्ठविग्रदार्थमत्तिविकारणार्थे प्रदर्षकार्थेव ॥

प्राक्षमत्वसंखयेष्टं भीजयेदातुरं भिषक् । मदापं पाययेत्रादां तीच्यं योऽवेदनासतः ॥ न मूच्छंत्वन्नसंयोगात्रातः अस्तं न नुध्यते । तस्यादनस्यं भीकव्यं रीगेपूत्तेषु कसीनि ॥ प्राणी ज्ञासन्तरी नृणां वाक्षप्राणगुणान्तितः । धारवव्यविरोधेन अरीरं पासभौतिकं ॥

mentions Mandragora (Mandragora Atropa) to have been employed internally as a hypnotic and anæsthetic. Pliny (32-79 A.D.) in his Natural History mentions that this anæsthetic was also used by inhalation; and this fact is corroborated by Galen, Aractæus, Celsus and others. The Arabian physicians also used it. The Chinese surgeons still use some powder (Indian hemp probably) to throw their patients into profound sleep. In the 13th century Theodoric (died 1298) described the "spongio somnifera" the vapours raised from which were capable, when inhaled, of setting patients into an anæsthetic sleep, thus inducing insensibility to the agony and torture of a surgeon's knife. Baptista also mentions his "Pomum somniferum", to be made with mandragora, opium, &c. The Hindus also inhaled the fumes of burning Indian hemp as an anaesthetic at a period of great antiquity. As early as 927, A. D., they also knew drugs which they employed for the same purpose, for Pandit Vallāla, in his Bhoja Prabandha, alludes to a cranial operation performed on the King Bhoja after he was rendered insensible by some drug called Sammohin (producer of unconsciousness). Another drug is also mentioned, Sanjibani (restorer to life), by which he soon regained consciousness after the operation had been finished.1

ततसाविप राजानं मोइच्चेंन मीइयिला त्रिरः कपालमादाय तत्करोटिकापुटे खितं यफरकुलं रहीला किखियिकाजने निचिय्य सन्धानकरणया कपालं ययावदारचय्य सञ्जीवना च तं जीवियिला तकी तहमेयताम्।

Bhoja Prabandha (Jibananda's Edn.), P. 98.

CHAPTER III.

MATERIALS OF INSTRUMENTS.

IRON AND STEEL.

In the Rgveda, ayas, (Latin aes), next to gold, is the metal most often referred to. Ayas often stands as a generic name to mean simply "metal," though in later works it signifies iron as a rule. The mention of dark and red ayas in the Atharvaveda indicates a distinction between iron and copper or bronze. The surgical instruments of the Hindus are recommended generally to be made of iron; but Susruta allows other suitable material when iron of good quality is not available. He says: "A wise surgeon should get the instruments made of pure iron and with sharp edges by an expert blacksmith who is skilful and experienced in his craft." The use of impure iron as a material for surgical instruments, he deprecates as a defect and advises the surgeons not to rely on such instruments.

The Hindus were acquainted with steel and they knew how to turn out steel of fine quality from a pure iron ore. Nagarjuna, the well known Buddhist chemist, wrote a scientific

Saaruta Samhita. I. vii,

वानि प्रायशी लीहानि भवनि तत्प्रतिरुपकाणि वा तदलाभे।

श्रक्ताखोतानि मतिमान् ग्रवशैकायसानि तु । कारयेत् करणै: प्राप्तं कर्यारं कर्यकोविदं ॥

treatise on steel and iron. Sibodāsa in his commentary on Chakrapāṇi quotes Patañjali as an authority on the subject. In the Dhanurveda, Viracintāmaṇi, Śārañgadharapaddhati and Lohārnava, steel as a material of sword has been described and classified.

Dr. Mitra quotes some references about the knowledge of iron possessed by the ancient Hindus from the Rgvida. He finds that "swords (H. 156), spears (IV. 25), javelins (II. 292), lances (I. 774), (IV. II. 288) and hatchets (I. 120) are frequently mentioned; and these weapons were bright as "gold" or golden (IV. 19), "shining bright" (I. 175), "blazing" (IV. 93), "sharp" (IV. 113) and "made of iron" (I. 226); they are "whetted on a grind stone (II. 36) to improve their keenness (I. 150), and "polished to enhance their brightness" (II. 326)......"According to Nearchus, King Porus gave 30 lbs of steel to Alexander as the most precious present he could offer."

Royle also remarks4: "Working in metals they have long been famous for: their steel acquired so great celebrity at an

Cakradatta, Rasāyanādhikāra.

अर्चयिला विधानेन इंरम्नं गुरुभाक्तरी। लीकपालान् यहाँचैव चेवपालानवीयधम्। आदिव्यदेवतायेहा धन्वन्तरी-पत्तक्षली द्यादिल्य मर्वेभी नानाभवीपचारतः॥

> Quoted in Sibodas's commentary on Louhamarana-Vidhi in Cakradatta.

नागान्त्रं नी मुनीन्द्र श्रंशास यश्लीष्टशास्त्रमतिगष्टनम्। तस्यार्थस्य खूतये वयमेतिहशदाचरेर्त्रमः॥

Dr. R. L. Mitra's Indo-Aryans, Vol. 1, P. 301. See Wilson's Rgveda,

Royle's Antiquity of Hindoo Medicine. Pp. 46-7.

early period; as to have passed into a proverb among the Persians, where fouladee hind indicates steel of the best quality; and juwabee hind, an Indian answer, means a cut with a sword made of Indian steel."

COPPER.

Pure copper was also used as a material of instruments; and vessels and instruments of copper are frequently mentioned in the medical books of the Hindus. A copper probe for applying antimony to the eye has been found in the excavations of Bijnor and another in the Bihat excavations. Cakradatta¹ advises us to use a copper probe for the application of lekhana collyrium; and susruta mentions a copper needle in the operation for reclination of cataract.²

TIN.

Tin was also used as a material of blunt instruments. Susruta mentions plates of tin to surround a tumour and to protect the healthy parts, before the application of actual cautery. Such plates are recommended to be made of tin, or lead, or copper, or iron.

LEAD.

Tubes of lead were used for purpose of fumigation. Probes made of lead were used for application of collyrium. The use

¹ प्रमत्ता लेखने ताबी रीपने काललीइजा।

Cakradatta, Afijanadhikāra.

² तासायसी भातकीभी भलाका स्यादनिन्दिता।

Susruta Samhita, VI. xvii.

अध्याविष्ठि क्रिमिभः क्रते च लिखेनतीऽधि विद्धीत प्यान्। यद्यमूलं तपुताबसीस पर्शः समाविष्य तदायसेव्यां। चाराधिश्रकात्य सक्रद्विद्ध्यान् प्रानाचहिंसनं भिष्ग्प्रमत्तः॥

Suśruta Samhitä, IV. xviii.

of lead plates to sorround tumours before application of actual cautery has been noted above.

BELL-METAL.

The use of bell-metal—an amalgam of zinc or tin and copper, 25 parts of the former with 75 parts of the latter,—as a material of probes for applying collyrium, is mentioned by Suśruta.¹

GOLD AND SILVER.

Gold was known to the Hindus from the remote antiquity; and among the metals, it is the one most frequently mentioned in the Rgveda. Silver was perhaps unknown during the earlier Vedic age, from its name being not mentioned in the Rgveda. But no conclusion can safely be drawn from this argument. We find, however, gold, silver, and other precious

भीवच राजतं शार्जनामं वेद्र्यकांस्त्रज भायसानि च यीज्यानि श्रताकाय यथाकमं ॥

Suśruta Samhita, VI. xviii.

³ "निष्त ग्रीव"

Rgveda. 5 Mandala, 19 Sükta.

"निष्त्रेन सुवर्धे न चलकृता गीवा"।

Sāyana.

अबः न हेम्याबान्।

Ibid. 4 Mandala, 2 Sükta.

"स्वर्ष निर्मित कच्छावान् सन्तः"।

Sāyana.

"A horse with golden caparisons"—Wilson.

³ "एनीं रिवं"।

Rgveda, 5 Mandala, 33 Sükta,

एनवर्षा खेतवर्षा रियं धनं ।

Sayana.

[&]quot;Query, if silver money be intended "-Wilson,

stones mentioned as materials of instruments in the medical books. Gold and silver vessels and plates are often described in Sanskrit literature.1 Susruta mentions the use of drinking cups made of gold, silver and precious stones.2

Caraka, amongst other things necessary for a lying-in-room, mentions two needles of gold and silver.3 To cut the navelcord of the new-born child, he recommends a knife made of gold, or silver, or iron.4 In the Manusamhita5 we find: "Before the section of the navel string, a ceremony is ordained on the birth of a male; he must be made while sacred texts are pronounced, to taste a little honey and clarified butter from a golden spoon." A golden needle is mentioned by

स्वर्गेकप्यशहास्स ग्राति रव मयानि च। कांस्याय साम रैत्यानि एपसीस स्यानि च। निलपानि विश्वद्यानि कैवलिए जलीन तु॥

इति बाचे।

सीवणें राजते तासे कांसी मिश्रमी तथा पुष्पावतंसं भीमे वा सुगन्धि सखिलं पिवेत ॥

Suśruta Samhitä, I. xlv.

- * * * तीका मुचोपियलको सोवण राजतो हे मस्त्राणि च तीकायसानि । Caraka Samhita, IV. viii.
- नाभिवस्त्रनात प्रसति जिलाष्टाङ्वमभिज्ञानं कला चोदनावकाशसा इयीवनारयीः मनेर्य हीला तीकोन रीकाराजतायसानां हेदनानामन्यतमेनी वंधारेन हेदयेत्॥

Thid.

प्राङ नाभिवर्धनालं नी जातकर्थ विधीयते। मनावन्याश्रनं चासा चिरव्यमध्सर्पियाम ॥

Manusamhitä, II. 29,

Manusamhită (ch. II. V. 29, Jones's trans.)

Susruta for pricking the bulb of Soma plant to extract its juice.¹ To cure trichiasis, Cackradatta mentions a needle cautery of gold.² For destroying the hair follicles, he advises us to pass the hot needle into them as soon as the eyelashes are removed by epilation. In the Yogaratnākara, is mentioned a cautery of gold, to burn the fistuious track round the anus.³ Śārṅgadhara mentions silver or coral pots for keeping medicated snuffs,⁴ and gold and silver tubs for immersing patients in medicated lotions.⁵

HORN.

Horns of animals are mentioned as suction-apparatus. For

1 * * * * चीमकन्दं सुवर्णम्वादिविदायं पयीस्पन्नीयात् सीवर्णे पावेऽस्रविसावं * * * *

Suśruta Samhita, IV. xxix.

प्रवहानक्युंखं रोन महिष्णीस्वरक्क्नै: । मन्दंगीनीवरिक्षणां पक्षरोमाणि वृत्तिमान् । रखविच दछेत् पक्ष तप्तर्षेमग्रलाक्या । पक्षरोगे पुननैवं कदाचिद्रोमसक्थव: ॥

Cakradatta, Netraroga Cikitsä.

अपानमार्गपिटिकां दचेत् खर्गंशलाकया।
 अधिप्रतप्तया पथात् कुथ्यादिशिवणिकयाम्॥

Yogaratnākara, p. 347. (Anandāsram Serjes).

की चमिक्क प्रधारव हेमतारादिश् किमि:।
 श्रुव्या वा पावे युक्या वा प्राते क्वां नस्यमाचरित्॥

Saragadhara Saingraha, III. viii.

सीवर्षे राजतं वापि तासमायसचदाक्तं।
 चीठवं तच कुलीतीक्त्राये पठविमदङ्गलं॥

this purpose, the horn of a cow is recommended. A probe made of horn is advised to be used for applying collyrium. Susruta mentions goat's horn to be used as a container of medicine. He also recommends for this purpose vessels manufactured out of horn. Similarly Caraka advises us to keep medicines in the lamb's horn. Tubes of Vasti-yantra (clysters) are often described to be made of horn.

BONE AND IVORY.

Vagbhaṭa II describes the aṅguli-trāṇaka or finger-guard to be made either of wood or ivory.

- ग "नुष्णि", विष पूर्याद्या चूषण निमित्तं शरीरेषु युज्यते यत्, "श्रङ्गः" गवादि भवं युविर श्रङ्गः * * * *
 Vägbhatärtha Kaumudi, I. xxv.

 - प्रतक्षणीवन' ग्रेष्ठ' निवित' भाजने ग्रमे । इन्तर्काटकवैदृष्यं शढभेलासनीविते । शातक्षेऽष्य शाक्ष' वा राजते वा सुसंक्षते ॥

Suiruta Samhita, VI. xix.

- 4 सिंद: श्रैलासने भाग्छे मेथग्रके च संस्थित: ॥ Caraka Samhita, VI. xxvi.
- विसुद्रासं विख्लाच धातृजां काहजां तथा। पङ्कुलीस्थां गीपुक्तां गाड़ी' युद्धात् विद्यस्तिकां॥ Sarngadhara Sarngraha, III. ii.
- चहुनि वाणकं दानं वाचे वा चतुराहुनं।
 Astanga Hrdaya. I. XXV.

WOOD.

To apply vapour-bath, Sārngadhara mentions tubes made of wood or metal. Wooden Tubes for injections were also used. 2

STONE.

Sārngadhara says: "The collyrium probes should be made either of stone or metal". For compounding medicines, stone *khal* or mortar and pestles are mentioned. A big stone slab with a muller is recommended to be used for grinding dry or fresh vegetable medicines. In extracting the Soma juice, two slabs of stone are mentioned in the Rgveda.

EXECUTION.

The execution of the instruments is said to have been all that can be desired. Suśruta says 5: "They should be made just of the proper size with their ends rough or polished; they should be also strong, well-shaped and capable of a firm grasp."

Again he continues: "When an instrument (has been selected) of

नैवानि घातुजान्याष्ट्रनेख वंशादिजान्यपि॥

Sarngadhara Samgraha, III. ix.

नितं कार्थं सुवर्षादिधातुमित्तचविस्तिः। नलेईन्छेविषासायैः मिषिभिया विषीयते॥

Ibid, III. v.

मुखयीः कुष्टिता द्रच्या मलाकाष्ठाङ्गुलीन्यता ।
 च्यमजा धातुजा वा स्थात् कलायपरिमञ्जला ॥

Ibid, III. xiii.

- Rgveda, 10 Mandala, 76, 94 & 175 Süktas.
- समाहितानि यनाणि खरद्रचामुखानि च। सुद्ध्वानि सुरुपाणि सुग्रहाणि च कारयेत ॥

a fine make and with an edge keen enough to divide the hairs on the skin, and when it has been firmly grasped at the proper place, only then it should be used in any surgical operation".

And again: "A wise surgeon will get his instruments made of good iron and with sharp edges, by a blacksmith who is skilful and experienced in his craft." Vāgbhaṭa also gives the same directions."

ORNAMENTATION.

In the absence of actual specimen, it is impossible to say whether there was any ornamentation on the surgical instruments of the Hindus. No ornamentation is described in the extant medical treatises. Only one instrument—Mucuti—is mentioned by Vāgbhaṭa II as being ornamented with a ring.⁴

EDGES OF SHARP INSTRUMENTS.

Suśruta says⁵: "The edges of instruments, used in incising

यदा सुनिश्चितं शस्त्रं रोमच्चेदि सुसंस्थितं । सुग्रहीतं प्रमाणेन तदा कसंसु यीजयेत् ॥

Ibid, L viii.

- See foot-note 2, P. 61.
- वह्विंशतिः सुकर्मारैपंटितानि यथाविषि । श्रस्ताचि रोमवाशीनि वाङ्ख्येनाङ्गुलानि षट् ॥ सुद्धपाचि सुधाराचि सुग्रहाचि च कारयेत् । श्रकरालानि सुधातसृतीजावार्णतेऽयित ॥ समाहितसुखायाचि नीलाभोजच्चवीनि च । नामानुगतद्धाचि सदा सन्निहितानि च ॥

Aştanga Hrdaya, I. xxv.

सुनुटी स्चा दन्तर्नुर्नृति क्वकस्यवा।

Ibid.

े तत्रधारा भेदनानां मात्री । श्रीखनानामर्थमात्री । व्यथनानां विखावणानाथ केशिकी । क्षेदनानामर्थकेशिकीति ॥ Susruta Samhita, I, viii, (as of Vṛddhipatra, Nakhaśastra, &c.) should be of the fineness of a masūra (Ervum Lens); of those used in scarifying (as Maṇdalāgra &c.) of a half a masūra; of those used in puncturing (as Kuṭhārikā) and evacuating (as needles, kuśapatra, &c.) of a hair; and those used in dividing (as Vṛddhipatra), of half a hair". As to the Vaḍiśa or hook and the Dantaśańku or tooth-scalers, the former should have a curved end and a fine point, while the latter should have an end shaped like the first leaf of barley."¹

THE TEMPERING OF SHARP INSTRUMENTS.

Susruta remarks² that "the instruments are tempered in three ways;—by immersing the heated sastra in an alkaline solution, or water, or oil. Those tempered in an alkaline solution are used in dividing bones and in excising arrows and other foreign bodies. Those tempered in water are used in incising, dividing or clearing muscles; and those tempered in oil are used in puncturing veins and dividing nerves and tendons."

As the methods of tempering the sastras are the same as those recommended for the arms of war, we quote from Vrddha Sārngadhara (the elder), two methods of tempering arrowheads and swords. He says³: "I shall describe the ways of tempering arrowheads, by smearing them with a paste of

विकार्य दन्तमबुखानताचे तीत्राक्तन्यकप्रवस येवपतस्थि ।

Suśruta Samhitā, I. viif.

[े] तेषा पायना चिविधा चारीदकतैलीयु तच चारपायितं शरणलाास्थिक्देदनेषु। छदकपायितम् मांसक्देदनभेदनपाटनेषु तैलपायितं सिराव्यधनसायुक्तेदनेषु।

अलस्य पायनं वस्त्ये वनौषधिविलिपने:।
यन दुर्भेद्यवसीशि भेद्येत तरुपर्णवतः।।

vegetable drugs, which would thus acquire the power of piercing a coat-of-mail as easily as the leaf of a tree."

I.

"Make a paste of Pippali (Piper Longum), rock-salt and Kuṣṭha (Saussurea Lappa) with cow's urine. These are to be well mixed until the paste becomes cold and yellow. The arrowheads and other sharp cutting instruments are to be well smeared with that paste and then heated to redness. Then they are to be removed from the furnace and allowed to cool down to a state short of redness and dipped in oil. By this means, the iron acquires special power as a cutting instrument."

П.

"Make a paste of the five kinds of salts," mustard and honey. Let the instrument-maker smear it on the sastras which are then to be heated in a furnace. When the colours resembling those of a peacock's feather are displayed on the sastra, the burning is known to be adequate. The instrument is then dipped in water."

- पियली सैश्ववं कुठं गोम्बेन तु पेषयेत्। अतिशीत मनाविदं पीतं नष्टं तथीवधम्॥ अनेन लेपयेक्टसं लितं चाग्री प्रतापयेत्। तती निर्वापितं तैले लीइं तच विशिष्ते॥
 - धीवर्चलं सैन्यवश्च विड्मीहिट्मेव च । सामुद्रेन सहैतानि पश्चमुर्जवसानि च ॥
- पद्मिलंबचे: पिटं मध्सिक्त: समर्थपे:। एमि: प्रलिपयेच्छकं लितं चाग्रौ प्रतापयेत्।। शिखिबीवानुवर्णामं तक्षपीतं तथीपधं। ततल् विमलं तीथं पाययेच्छक्तमृत्तसम्॥

Vrddhya Śarngadhara.

Vaidyaka.

Vrddhya Śarngadhara.

III.

The sage Uşanās or Śukrācāryya thus describes¹ the tempering of swords in the Vṛhat Samhitā (Kern's trans. Ch. L.):—

- 23. The fluid to imbrue a sword with, according to the precepts of Uśanās, is: blood, if one wishes for a splendid fortune; ghee, if one is desirous to have a virtuous son; water, if one is longing for inexhaustible wealth.
- 24. An approved mixture to imbrue the sword with, in case of one desirous to attain his object by wicked means, is: milk from a mare, a camel and an elephant. A mixture of fish bile, deer-milk, horse-milk, and goat-milk, blended with toddy, will make the sword fit to cut an elephant's trunk.
- 25. A sword first rubbed with oil, and then imbrued with an unguent compounded of the milky juice of the Calotropis, goat's horn, ink, dung from doves and mice, and afterwards whetted, is fit for piercing stone.

वड्वीष्ट्रकरेखदुन्धपानं यदिपानेन समीइतेऽयंसितिः। भविष्टस्गाय वसदुन्धेः करिडसच्छिदये सतालगर्भेः॥ याकं पयी इड्ड विषाणमसीसमितं पारवतास्य शक्तता च युत्तं प्रस्तिः। शस्त्रस्य तेलस्यितस्य ततोऽस्य पानं पश्चाच्छितस्य न शिलासु भवेडियातः॥ चारे कदल्या मियतेन युक्ते दिनीषिते पायितसायसं यत्। सम्यक् शितं धास्त्रनि नैति भद्गं न चान्यलीडिवपि तस्य कौष्ठाम॥

26. An instrument imbrued with a stale mixture of potash of plantains with butter milk, and properly whetted, will not get crooked on a stone, nor blunted on other iron instruments.

GOOD AND BAD QUALITIES OF SURGICAL INSTRUMENTS.

Susruta says¹: "The good points in an instrument are the following: it should have a well-made handle, affording a firm grasp; it should be made of iron of good quality; it should have a fine edge, a pleasant shape and a well-finished point; and it should not be dentated (except the saw)." He gives preference to the Sastras which are of good make and with a fine edge—so fine as to divide the hairs on the skin and whose handles can easily be grasped by the surgeon's hand.

On the other hand, he points out eight defects of sharp instruments: they must not be bent, or blunt, or broken, or jagged, or too thick, or too thin, or too long, or too short. Instruments free from these defects should be used. The Karapatra or saw is the only exception, for being used for sawing bones, it requires a jagged or dentated edge. Vägbhata also mentions these defects.

Ibid.

गतानि सुवशिष सुक्षीदृशिष सुधारानि सुद्धपाचि सुसमादितमुखायध्वकरालानि चिति
श्रक्षसम्पत्।
Sufruta Sathhita, I. viii.

तत वर्त्रं इग्छं खण्डं खरवारंमित्खूलमलल्यमितदीचंमितङ्खिमल्यटी अस्त्रदीयाः।
वती विपरीतगुषमाददीतान्त्रत करपवानित खरधारमित्यच्चेदनीयं।

कुछ-खन्ध-तनु-स्वृत-इस-दीर्घल-वकताः।
 मस्तानां खरधारलमटी दीवाः प्रकीर्मिताः।

Susruta enumerates twelve defects¹ of blunt instruments, viz., it may be too thick, or made of impure metal, or too long, or too short, or incapble of being grasped, or capable of being grasped (unevenly) partially, or bent, or made of too soft material, or of elevated ends, or it may have bent, loose, elevated, and weak pins, or be of weak ends, or of thin sides. These faults refer principally to the Swastika yantras or the cruciform instruments.

THE USES OF INSTRUMENTS.

Twenty four different kinds of operations² are said to be performed by the blunt instruments (Suśruta), viz.:—

- Nirghātana ... Extraction by moving to and fro. e. g. śalyanirghātanī.
 - 2. Pūraņa ... Filling the bladder or eyes with oils
- 3. Bandhana Bandaging and binding by rope.
- 4. Vyūhana ... 1. Raising up and incising a part for removing a thorn or 2. bringing together the lips of the wound.
- 5. Vartana ... Contracting or curling up.

Suśruta Samhitā, I. vii.

तवातिस्वृत्तमसारमितदीर्धमितिङसमयादिविषमयादि वक्रं विवित्तमत्वृद्धतं सदुक्षीतं सदुक्षीतं सदुक्षीतं सदुक्षीतं सदुक्षीतं ।

श्वनक्षांनितः निर्धातनप्रणवसन्य्इनवर्त्तनचालनविवर्णनिवरणपौड्नमार्गः विश्रीधनविक्षंणाचरणाधनीदमनविनमनभञ्जनीयादनाचूय्येषणदारणज्ञ्जरणप्रचालनप्रधमन-प्रमार्ज्ञनानि चतुर्व्वेशतिः।

... 1. transferring, i.e., removing 6. Calana from one part to another; 2. moving a foreign body. ... Turning round. Vivartana 7. ... Exposing or opening out any 8. Vivarana part. ... Pressing as by finger to let 9. Pidana ... out pus from an abcess. ... Clearing the canals such as the 10. Mārga Viśodhana urethra, rectum &c. ... 1. Extraction by pulling; or 2. 11. Vikarşana loosening a foreign body fixed in muscles &c. ... Pulling out. 12. Aharana Pulling up. Āñcana ... 13. ... Elevating or setting upright as 14. Unnamana the depressed cranial bones or ears. ... Depression as of the elevated 15. Vinamana ends of the fractured bone. ... 1. Rubbing the head, ears &c.; 16. Bhanjana 2. contusing a part all round is surgically before it operated on. ... Probing or stirring the track 17. Unmathana formed by an impacted foreign body. ... Suction as of poisoned blood Acusana 18. and milk by horns, or gourd,

or mouth.

19. Esana	Exploring as by an earth-worm
	shaped probe, the direction of
	a sinus or the existence of a
	foreign body in the wound.
90 Desere	O-1141

 Dāraṇa ... Splitting or dividing as the head, ears &c.

Rjukarana ... Straightening anything which is bent.

22. Prakṣālana ... Washing as a wound with water.

Pradhamana ... Blowing as powders into the nose through tubes,

24. Pramārjana ... Rubbing out as foreign bodies from the eyes &c.

Vāgbhaṭa recognises only fifteen different kinds¹ of operations performed by the blunt instruments: Nirghātana (moving to and fro), Unmathana (probing), Pūraṇa (filling up), Mārga Śuddhi (clearing passages), Saṃvyūhana (raising up and extracting a thorn by incision), Āharaṇa (pulling out), Bandhana (bandaging), Pīḍana (pressing), Ācūṣaṇa (suction), Unnamana (elevation), Nāmana (depression), Cāla (movement), Bhaṅga (breaking), Vyāvartana (turning round); and Rjukaraṇa (straightening).

नियातनीत्मधन पूर्ण मार्गयदि संव्युहनाहर्ण वसन पीड़नानि । आव्यजीवमन नामन चाल भक्त व्यावर्तनर्जुकरणानि च सलकमं ॥

The sastras or cutting instruments, on the other hand, are said to perform eight kinds of surgical operations (Susruta).

Chedana ... Excision or removal of a part
 of the body by operation as
 of piles.

Instruments:—Vṛddhipatra, nakhaśastra, mudrikā, utpalapatra, and arddhadhāra.

Bhedana ... Incision of a part, as of an abscess.

Instruments:-The same as above.

3. Lekhana ... Scarification or dissection of a skin-flap; or scraping, as of Rohini i.e., surgical diseases of the throat.

Instruments:—Maṇdalāgra and karapatra.

 Vedana or Vyādhanz ... Puncturing as of veins to bleed patients by instruments having fine points.

Instruments:—Kuţhārikā, vrīhimukha, ārā, vetaspatra, and sūcī.

 Eṣaṇa ... Probing, as of sinus and fistula by a probe.

Instruments:-Eṣaṇī.

6. Aharana. ... Extraction, as of stone by the spoon or hook.

Instruments:-Vadiša, and danta-šanku.

[ै] तम ज्ञास्त्रकर्मा। इतिथं। तयज्ञा। ईयं भेवां तीस्त्रं विध्यमेकमादायं विस्तायां सीव्यनिति। Sufruta Samhita, L. v.

 Viśrāvaņa ... To let out pus as from a deepseated abscess.

Instruments:—Sūcī, kušapatra, ātīmukha, šarārīmukha, antarmukha, trikurccaka, and eşanī.

8. Sivana ... Stitching, as of the lips of a wound by needles.

Instruments:—The different kinds of sūcī or needles.

Caraka mentions, however, six kinds¹ of operations:—

- 1. Pātana Incision, as in operation for sinus, abscess, intestinal injury, and deeply impacted foreign bodies.
- 2. Vyādhana ... Tapping or piercing, as in operations for ascites, suppurating tumour, ovarion tumour, boils &c.
 - पाटनं व्यवनवेव च्हेदनं लिपनं तथा।
 प्रोक्तनं सीवनवेव पड़विषं प्रस्तककं तत् ॥
 नाड़ीववा: पक्तपीयास्त्रया चतग्दीदरम्।
 चन:श्रचाय ये दंशा: पाद्याले तविषाय ये ॥
 दकीदराणि संपका गुना: ये ये च रक्तजा:।
 व्यथ्या: श्रीणितरीगाय वीसर्पेपड़कादयः॥
 चद्रवत्तान् स्यूलपर्यातान्त्सवान् कठिनान् व्रणान्।
 चर्म:प्रस्त्यवीमांसं छदनेनीपपादयेत्॥
 किलासानि सुकुठानि लिखेझेख्यानि दुविमान्॥
 वातास्त्यायिपड़का: सकीदा रक्तमख्यताः।
 कुठान्तमिद्दित्वावं श्रीयांय प्रच्यविष्यत्॥
 सीव्यं कुच्यदरायन्त गन्नीरं यविषाटितं।
 इति षडविषमुद्धं श्रम्यकर्णं मनोषिप्ति:॥

3.	Chedana	 Excision, as in the operation for
		tumours, raised and thickened
		vraņo or corns, and piles.
	2007	Comming as in operation for

- 4. Lekhana ... Scraping, as in operation for some varieties of skin diseases.
- Pracchana ... Scarifying, as in the operations for glands, boils, leprous nodules, inflammatory swellings, &c.
- 6. Sibana ... Sewing, as in the operation of laparotomy for deep seated diseases in the abdomen.

Vāgbhaṭa describes thirteen kinds¹ of operations performed by the sharp instruments:—

1.	Utpātana	***	Raising	up by	incision,	as by
	2010/00/00/00/00		the N	akhaśa	stra.	

- 2. Patana ... Incision as by the Vrddhipatra.
- Sivana ... Stitching as by the Sucl.
- Eṣaṇa ... Probing as by the Eṣaṇi.
- Lekhana ... Scraping as by the Mandalāgra.
- 6. Pracchana ... Scarification as by the Mandalägra.
- 7. Kuṭṭana ... Pricking as by the Suci in tattooing.
- 8. Chedana ... Excision as by the Vrddhipatra.

Aştanga Hrdaya, I. x.vi.

उत्पाद्य पाद्य सीथिय-लिख-प्रच्चत्र कृष्ट्यम् । ह्रियं भेवं व्यक्षी मयी यही दाह्य तत्कियाः ॥

9.	Bhedana		Piercing a	s by	the Sharp	Esant.
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Vyadhana ... Tapping as by the Vetasapatra.

11. Manthana ... Churning as by the Khaja.

Grahana ... Fixing as by the Sandamsa.

Dahana ... Burning as by the rods.

WHETSTONE.

In the Rgveda we find the use of stones mentioned for whetting the edges of the arms of war.¹ The Hindu surgeons used a stone slab for sharpening the sastras or edged instruments.² It was of the colour of māṣa (Phaseolus Roxb.). The whetstones used by the Greeks and Romans were either the marble ointment slabs, or made of clay slate or sandy schistaceous shale.

INSTRUMENT CASES.

To preserve the edges of the cutting instruments, a case made of the wood of salmālī (Bombax Malabaricum) was used (Suśruta).³ Such cases were also manufactured of canvas, or wool, or silk, or leather. These cases—twelve aiguli (i.e., fingers' breadth) long and nine aiguli broad—were well sewn and

,, 9 ,, 90 ,, 1.

,, 9 ,, 112 ,, 2.

,, 10 ,, 53 ,, 9,

,, 19 ,, 101 ,, 2

Suáruta Sambita, I. viii.

See Rgveda, Mandala. 2 Sükta. 39 Verse 7.

[&]quot; तेषां निमानार्थे अध्यमिता मायवर्था ।

³ धारसंस्थापनाचे प्राचली फलकमिति।

consisted of compartments, lined with wool and seperated by partitions for each instrument. They could be folded, closed with a rod and firmly tied by a knot.1 The barbers of India still use similar cases for their instruments.

That the razor used to be kept in a case, we know from a passage in the Vrhadāranyaka (800 to 500 B. C.) where the author says "It (the Atman) is here all-pervading down to the tips of the nail. One does not see it any more than a razor hidden in its case or fire in its receptacle".2

 स्यात्रवाङ् लि विकार: सुधनी वादणावुल:। श्रीम पहीर्थ कीयेय दक्क सद चर्चाज:॥ विन्यस पाशः सुस्यूतः साना शीर्णास्य शक्तकः। ग्रामाका पिहितास्य य ग्रासकीयः सुराचयः ॥

Aşţānga Hrdaya, L. xxvi.

अब श्रस्ताची सुरचनाये. शस्त्रकीय माह स्यादित्यादि। नवाकुलिविसार: नवाकुल परिमानविसारविशिष्टः गस्तकीयः स्यात्। शस्तस्य कीयः शस्तकीयः। कीय चाप् इति सीके। यथा विस्कीय दलादि। तथा मृहु, धनी, निविदः सुधनः तथा बादमाहुनः दैखेंच बादमाबुल परिमानः, तथा चीमादिजः। तथा विन्यसः यथा क्रमेण कृतः पाणी यस्य स विन्नसपागः। तथा सृष्ठु, स्तृतः कत सेवनः, सुस्यूतः तथा सान्तराणि सव्यवधानानि, कर्णास्थानि सेवादिलीममध्येस्थितानि, श्रस्तानि यिखान् स सानरीर्णास्वश्रस्तः। तथा भलाकया: पिहितं स्वागतं चास्यं मुखं यस्य स भलाकापिहितास्य तथा सृहु सवयी, नापित भाखिकवद्रागीकरणं यस्य स सुसञ्चयः । चीमं जतसीस्वमववस्तं केन्विस् ख्यातः । दुक्लग्रदः पद्दादिभि: खिभि: सम्बध्यते । तेन पद्दुक्तं पाट् इति स्थातेन स्चेन निर्मितं वस्तं जनां, संवादिलीम तहवं वस्तं चीर्णं दुक्लंबनात् इत्याख्य वस्तादि। कीवेयदुक्लं कीवकार-कौटभव सुबेण रैशम् इति खातेन निर्मातं वस्तं।

Vägbhatärtha Kaumudi.

Vrhadāranyaka, I. iv. Macdonell's Sanskrit Literature, p. 22.

To prove that portable cases for medicaments and instruments were in use in ancient India, we quote in toto from the Mohāvāgga some references to them.¹

Boxes for Ointments, Ointment Pots, and Portable Cases.

Now at that time, the Bhikkhus used to put pulverised ointments into pots and saucers. They became sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a box for ointment".

Now at that time the Khabbaggiya Bhikkhus used to carry about various kinds of boxes for ointments—gold ones and silver ones. People were annoyed, murmured and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of boxes for ointments, gold ones, and silver ones, are not, O Bhikkhus, to be used. Whosoever does so, is guilty of a dukkata offence. I allow, O Bhikkhus, the use of such boxes made of bone, or ivory, or horn, or of the nata reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of bronze, or of the centre of the chank-shell (Sankhu-navi)."

2. Now at that time the boxes of ointment had no lid. (The ointment) was sprinkled over with herb-powder and dust.

They told this thing to the Blessed One.

Mohavagga vi. 12. (Sacred Books of the East).

"I allow you, O Bhikkhus, the use of a lid."

The lid used to fall off.

"I allow, O Bhikkhus, to fasten the lid with thread and tie it on to the box."

The boxes used to fall.

"I allow you, O Bhikkhus, to sew the boxes on with thread".

3. Now at that time the Bhikkhus used to rub ointment on with their fingers, and the eyes were hurt.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a stick or holder to put the ointment on with".

Now at that time the Khabbaggiya Bhikkhus used to keep various kinds of ointment-sticks—gold ones, and silver ones. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world".

They told this thing to the Blessed One.

"Various kinds of ointment-holders, O Bhikkhus, are not to be used. Whosoever does so, is guilty of a dukkata offence. I allow, O Bhikkhus, the use of ointment-holders of bone, or of ivory. or of horn, or of the nala reed, or of bambu, or of wood, or of lac, or of fruit, or of bronze, or of the chank-shell."

4. Now at that time the ointment-sticks used to fall on the ground and become rough.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a case for the ointmentsticks". 84

Now at that time the Bhikkhus used to carry the ointmentboxes and ointment-sticks about in their hands.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a bag to put the ointmentbox in."

They had no shoulder strap.

"I allow you, O Bhikkhus, the use of a shoulder strap (by which to carry the ointment-box), or of a thread (by which to sew or tie it on)."

13.

 Now at that time the venerable Pilindavakkha had head-ache.

"I allow, O Bhikkhus, the use of a little oil on the head".

(The disease) became no better.

"I allow, O Bhikkhus, the practice of taking up (medicine) through the nose". (See commentary on the Dhammapada, pp. 83.)

The nose ran.

"I allow, O Bhikkhus, the use of a nose-spoon" (Natthukaranî).

Now at that time the Khabbaggiya Bhikkhus had various kinds of nose-spoons—made of gold, and of silver. People were annoyed, murmured, and became angry, saying, "Like those who still live in the world."

They told this thing to the Blessed One.

"Various kinds of nose-spoons, O Bhikkhus, are not to be used. Whosoever does so, is guilty of dukkata offence. I allow, O Bhikkhus, the use of such nose-spoons made of bone, (&c., as in chap. 12, 1, down to:) the chank-shell.

2. The nose took up the medicament in unequal propor-

"I allow, O Bhikkhus, the use of a double nose-spoon (yamaka-natthu-karanî)."

They used to spread the drugs on a wick before they sniffed up the aroma: and their throats got burnt.

'I allow, O Bhikkhus, the use of a pipe to conduct the aroma.'

Now at that time the Khabbaggiya Bhikkhus had various kinds of pipes (&c., as in the last clauses of § 1, down to the end).

Now at that time the aroma-pipes came open: and worms got in.

'I allow, O Bhikkhus, the use of a lid to the pipes.'

Now at that time the Bhikkhus carried the pipes about in their hands.

I. allow, O Bhikkhus, the use of a bag to carry the aromapipes in'.

The aroma-pipes rubbed against one another,

'I allow, O Bhikkhus, the use of a double bag.'

They had no shoulder strap.

'I allow, O Bhikkhus, the use of a shoulder strap (by which to carry the double bag), or of a thread (by which to sew it on).

OPERATION TABLE.

In the examination for piles, Susruta directs the patient to lie down on his bed or on a board¹; and in describing the operation, Vāgbhaṭa II mentions a board to be used as an operationtable.² A similar bed, as long as the distance from the top of the head to the knees of the patient, is also mentioned in the discription of the lithotomy operation.² The use of a board as a fracture bed is also advised.

For passing the tubes of the vasti-yantra or clysters into the urethra in the male, the patient is recommended to sit on a stool as high as his knees (jānumātrāsana).4

In phlebotomy, the patient is advised to sit on a stool, an aratni high⁵ (i.e. the distance between the tip of the olecranon process of the ulna to the tip of the little finger).

1 सुक्रवनसुपवेश्य सभूते ग्रची देशे साधारचे व्यथे काले स्मी फलके श्रव्यायां वा प्रत्यादित्य-गुद्रसन्यस्वोत्सङ्के निषमपूर्व्यकायमुत्तानं * * * *

Suiruta Samhita, IV. vi.

श्वीं क्रतस्त्रम् भुक्तविष्मुतमञ्ज्ञयम् । श्वी भलके वानानरोत्सक्वे व्यापित्रतम् ॥

Aşţānga Hrdaya, VI. viii.

तती वलवनमविक्रवमाजानुसमै फलके प्रागुपवेख्य पुरवच तस्मीत्सक्तं निवसपूर्णकाय-मुत्तानसुन्नतकटीकं।

Sufruta Sazhhitā, IV. vii.

स्वातसा भ्रमभक्तसा रसेन प्यसापि वा।
 स्टिक्ज्विस्य पींठे जानुसमे सदी॥

Caraka Samhita, VIII. ix.

तत्र व्यथितरं पुर्वं प्रवादित्यमुखमरिबमानीच्यितं उपवेक्यासने ।

Suaruta Samhita, III. viii.

अधितापातपखित्रो जान्यासनसंस्थित: । सदुपशाचेशानो जानुस्थापितकपुँद: ॥

Aşţānga Hrdaya, I. xxvii.

KAPATA-ŚAYANA OR FRACTURE-BED.

In the treatment of fractures of the lower extremities, mention is made of the kapāta-šayana (lit. door-bed) or fracture-bed, consisting of a plank of wood resembling the panel of a door. The patient is to lie down on it. The board has five rods fixed to it, to which the fractured limb is tied to prevent any movement: two on each side of the joint and one on the plantar surface of the foot. Dallana explains it thus : In fractures of the bones of the leg, two rods are fixed on each side of the ankle and one supports the foot; in fracture of the thigh bone, two rods are fixed on each side of the knee or hip, and one under the foot. In a double fracture of the thigh bone and bones of the

भय जड़ीरुमग्रानां कपाट्ययनं हितं। कीलका वस्त्रनार्यंच पच कार्या विजनता। यथा न चलनं तस्य भग्नस्य क्रियते तथा। सस्रेरुमयती वी वी.तले चैकव कीलकः। श्रीखां वा प्रष्ठवंशि वा वसस्त्रक्यीसाया। भग्नसस्त्रिविमोचीषु विधिमेनं समाचरित्॥

Suśruta Samhita, IV. iii.

ै जड़ोरुमहोषु पचात् कर्याविशेष निर्द्धिश्वाह। यय जड़े लादि। जहोरुमग्न-चिकित्सितमार । भग्नानम् कार्यभग्नानम् । दिविधानामपीलपरि । कपाटशयनमवस्य कार्यम् । चलनम् कपाट शयनेनैव सह देशानरनयनार्यम् । भाधारमृत्शयनचालनार्य-सिल्यो । अधियमृतशरीरावयवचलन परिहारार्थं कीलाः । कीलानां पचसस्यालम् । जड़ोल्वांदियोरिकतरस्य भग्नमवेत्य तत जड़ाभग्ने तु गुल्पसन्धरमयतो दी एकय तलि एवं पच । जरुमग्ने जानुसन्धरमयतो दी दी । बङ्गसन्धरमयतचलि चैक द्रव्यतापि पच । उभयभङ्गा-पेचया तु सन्धिरिव कीलेयंन्यम् । तयाङ उभयतो विहिद्दीं गुल्पसीदीं च जानुनोः दी च वङ्गययोः तलि चैक एवं सत्र । अत जड़ील्वाः पार्ययोल्वां दी तलि चैकय कीलक इति किचित् पठिता । तदिवन्धकारैनं पठितम् । तस्यात्र पठनीयम् । गयदास्थात पाठान्तरं किमपि पठिता । तद्वाभावात्र लिखितम् । leg, seven rods are required,—two on the outer side of the ankle, knee, and groin, respectively, and one under the foot. The fracture-bed is recommended to be similarly availed of in fractures and dislocations of the loin, the spinal column, the chest, and the clavicle. And this mode of treatment, he adds, may advantageously be used for the other kinds of fractures and dislocations. Vāgbhaṭa II also mentions it in the treatment of fractures¹.

Hippocrates used a similar fracture-bed for the proper treatment of fractures and dislocations. It was called Scammum Hippocratic or bench of Hippocrates. As the figures of of this bench would elucidate the structure of the kapāta-ŝayana, we reproduce here three plates with their explanations given at the end of Vol. II, Genuine Works of Hippocrates (Syed. Soc.Ed.), and two plates—Scammum Hippocratis and Plinthium Nilcii from the Collection De chirurgiens Grees.

Fig. 1. The Scammum Hippocratis or Bench of Hippocrates, as represented by Andreas a Cruce (Officina chirrugica venetiis, 1596).

Fig. 2. The same as represented by M. Littré.

A. A board, 6 cubits long, 2 broad and 12 inches thick; not 13 as incorrectly stated by M. Littré.

B. The feet of the Axles, which are short.

कटी जङ्गोरुभग्रानां कपाटश्यनं हितम्। यनवार्यं तथा कीलाः पच कार्या विवन्धनाः ॥ जङ्गोवोः पार्त्रयोवों ही तल एकय कीलकः। योखां वा प्रष्ठवंशे वा वळसाचकयोक्तया॥

Aşţānga Hridya, VI. xxvii.

- CC. Axle-trees.
- DD. Grooves 3 inches deep, 3 broad, seperated from one another by 4 inches.
- E. A small post or pillar, fastened in the middle of the machine in a quadrangular hole.
 - F. Pillars a foot long.
- G. A cross-beam laid on the pillars FF, which can be placed at different heights by means of holes in the pillars.
- Fig. 3. Representation of the mode of reducing dislocation of the thigh outwards, as given by M. Littré (Œuv. d'Hipp., tom. iv, p. 305).

A mistake in the figure given by M. Littré is here corrected.

- A. A lever applied to the nates of the luxated side, and acting from without inwards, in order to bring the head of the bone into its cavity.
- B. Another lever, held by an assistant, put into one of the grooves of the machine, and intended to act against lever A.
- C. Grove in which the end of the lever A takes its point of support.
 - D. The luxated member.
 - EE. Extension and counter-extension.
- Fig. 4. Banc d'Hippocrate, d'après Rufus, servant à réduire différentes luxations. (Collection De Chirurgiens Grecs, Bibliothèque Nationale).
- Fig. 5. Plinthium, ou cadre de Nileus, d'après Héliodore. (Ibid).

CHAPTER IV.

0

THE NUMBER OF SURGICAL INSTRUMENTS.

The armamentarium of the Hindu surgeons consisted of a good number of surgical instruments. They are described to be of two kinds, the yantras and the sastras, i.e., the blunt and the sharp instruments. Susruta enumerates no less than one hundred and one varieties of the blunt instruments, and twenty different kinds of sharp instruments. Hārīta, on the other hand, enumerates twelve blunt instruments, twelve sharp instruments, and four prabandhas, as necessary for the operation of extraction of arrows and other foreign bodies. Vāgbhaṭa II mentions one hundred and fifteen kinds of blunt and twenty-six kinds of sharp instruments. Pālakapya (Treatment of Elephants) mentions ten kinds of sastras or sharp instruments though he describes the uses of other instruments required for the surgical treatment of diseases.

INSTRUMENTS AND THEIR CLASSIFICATION (SUSRUTA.)

Of the one hundred and one varieties of the blunt instruments, the surgeon's hand is rightly considered as the principal instrument, for without its help, no instrument can properly be used, and every surgical operation is under its control.² They are recommended to be used for the extraction

^{ं ।} वादभेव तु यन्ताणि भन्ताणि वादभेव तु । चलारि च प्रवसानां मलीवारि विनिर्देशेन् ॥

[ै] यक्त प्रतमिकी चरमव इसमिव प्रधानतमं यक्ताणामवगच्छ । वि कारण'। यक्षाद्वसाहते यक्ताणामप्रविदिव तदधीनत्वादाक्तकर्मणां।

of salya or foreign bodies, e.g., a dart, an arrow, a javelin, a spear, a peg, a pin, a bamboo rod, a stake &c. which cause pain to the body and mind.

A. Suśruta subdivides the blunt instruments into six classes, viz.:

I. Svastika or cruciform instruments 24 kin	ds.
II. Sandamsa or pincher-like 2	,
III. Tāla or picklock-like 2	n
IV. Nādī or tubular or hollow 20	29.
. V. Śalākā or rod or pricker-like 28	
VI. Upayantra or accessory 25	,,,
101	1

These instruments are advised to be made generally of iron, or of other suitable materials, when iron is not available. Their ends often resemble the faces of some ferocious beasts, or of deers, or birds. Hence the instruments should be so constructed as to have the likeness of their faces, following at the same time the directions of scientific treatises, or the instructions of teachers, or in imitation of other instruments, or in adaptation to the exigencies of the time. They should be of reasonable

गतानि षट्प्रकाराणि । तयदा । स्वित्तिकयनाणि । सन्तंत्रयनाणि । तालयनाणि । नाड़ीयनाणि । जातावायनाणि । उपयनाणिविति । तन चतुळिणेति स्वितिवयनाणि । दे सन्तंत्रयन्ते । दे एव तालयने । दिण्णतिनां याः । पष्टविण्णतिः श्रनाकाः । पश्चविण्णति स्वयनाणि ।

Suśruta Samhita, I. vii.

Hessler translates the terms as follows: Uncinate instrumenta, forcipum instrumenta, palmiformia instrumenta, hamata instrumenta, secundaria instrumenta,

Hessler's Suáruta, L vii.

size, with their ends rough or smooth as required. They should be of strong make, good shape and capable of a firm grasp.1

I. The Svastika or Cruciform instruments are-

- 1. Simhamukha. 2. Vyāghramukha. 3. Vṛkamukha.
- 4. Tarakşumukha. 5. P.kşamukha. 6. DvIpimukha.
- 7. Mārjāramukha. 8. Śrgālamukha. 9. Airvvārukamukha
- 10. Kākamukha. 11. Kańkamukha. 12. Kuraramukha.
- 13. Cāsamukha. 14. Bhāsamukha. 15. Śaśaghātīmukha.
- 16. Ulūkamukha. 17. Cillimukha. 18. Grdhramukha.
- 19. Syenamukha. 20. Krauńcamukha. 21. Bhrńgarājamukha.
- 22. Añjalikarṇamukha. 23. Avabhañjanamukha, and
- 24. Nandimukhamukha.

II. The Sandamsa or pincher-like instruments are-

- 1. Forceps with arms.
- 2. Forceps without arms.

सनाहितानि यकाथि खरङ्गामुखानि च। सुद्धानि सुरुपाणि सुरुहाणि च कारयेत॥

Susruta Samhita, I. vii.

भनेकरूपकार्थाणि यनाणि विविधान्ततः। विकल्पा कल्पयेर बुद्धाा ययास्यूलन्त वस्यते॥

भनीकान्यनुशस्त्राणि तानेवस्य विकल्पश्चेत्। भपराख्यापि यनादीन्यपश्चेगस्य श्रीगिकम्॥

Aştanga Hrdaya, I. xxv.

वानि श्रायश्री जीडानि भर्वान तत्प्रतिरुपकाणि वा तदलाभे। तत्र नानाप्रकाराणां व्यालानां सगपित्वां मुखेमुंखानि यलाणां प्रायशः सहशानि तथात्तत्मारुपादागमादुप-दिशादन्यनद्गैनाद्यतितय कारयेत्।

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III. The Tala or picklock-like instruments are— 1. Ekatāla,

2. Dwitāla.

IV. The Nāḍī or tubular instruments are—	1
For fistula-in-ano (1) with one slit; (2) with 2 slits	2
For piles (1) with one slit; (2) with 2 slits	2
For wounds	1
For clysters (Rectal) (Some authors describe 3 only)	4
For clysters (vaginal and urethral) (male and female)	3
For Hydrocele	1
For Ascites	1
For fumigation and inhalation	3
For Urethral Stricture	1
For Rectal ,,	1
For Cupping—gourd	1
	20
V. The Śalākā or rod-shaped instruments are—	.0
V. The Śalākā or rod-shaped instruments are— Gaṇḍūpadamukha or earth-worm like	2
	i.e
Gaṇḍūpadamukha or earth-worm like	2
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like	2
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like	2
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like	2 2 2
Gandūpadamukha or earth-worm like Šarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like Masūradalamukha or masūra pulse like	2 2 2 2
Gandūpadamukha or earth-worm like Šarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like Masūradalamukha or masūra pulse like Promārjana or swabs	2 2 2 2 2 2
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like Masūradalamukha or masūra pulse like Promārjana or swabs Khallamukha or spoons	2 2 2 2 2 2 3
Gaṇḍūpadamukha or earth-worm like Sarapuńkhamukha or arrow-stem like Sarpafaṇamukha or snake's hood like Vaḍiśamukha or fish-hook like Masūradalamukha or masūra pulse like Promārjana or swabs Khallamukha or spoons Jāmvavavadana or jambul seed like Aṅkuśavadana or goad like	2 2 2 2 2 2 3 3
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like Masūradalamukha or masūra pulse like Promārjana or swabs Khallamukha or spoons Jāmvavavadana or jambul seed like Ankušavadana or goad like Kolāsthidalamukha or plum seed like	2 2 2 2 2 6 3 3
Gandūpadamukha or earth-worm like Sarapunkhamukha or arrow-stem like Sarpafanamukha or snake's hood like Vadišamukha or fish-hook like Masūradalamukha or masūra pulse like Promārjana or swabs Khallamukha or spoons Jāmvavavadana or jambul seed like Ankušavadana or goad like Kolāsthidalamukha or plum seed like	2 2 2 2 2 3 3 3 1 1

VI. The Upayantra or accessory instruments are-

- 1. Rajju—thread. 2. Venikā—twine. 3. Paṭṭa—bandages.
 4. Carma—leather. 5. Valkala—bark of trees. 6. Latā—creepers. 7. Vastra—cloth. 8. Aṣṭhīlāśma—stone or pebble.
 9. Mudgara—hammer. 10. Pāṇipādatala—palm of the hand and sole of the foot. 11. Aṅguli—finger. 12. Jihvā—tongue. 13. Danta—tooth. 14. Nakha—nail. 15. Mukha—mouth. 16. Vāla—hair. 17. Aśvakaṭaka—the ring of a horse's bridle. 18. Śākhā—branch of a tree. 19. Sṭhīvana—spittle. 20. Pravāhaṇa—fluxing the patient. 21. Harṣa—objects exciting happiness. 22. Ayaṣkānta—a loadstone. 23. Kṣāra—caustic. 24. Agni—fire. 25. Bheṣaja—medicines.
- B. The sharp instruments or sastras are-
 - Mandalägra or round headed knife.
 - 2. Karapatra or saw (lit. like the human hand).
 - Vṛddhipatra (lit. like the leaf of vṛddhi—an unknown medicinal plant)—a razor.
 - 4. Nakha-sastra or nail-parer.
 - 5. Mudrika or finger-knife (like the last phalanx of the index finger).
 - Utpalapatra, a knife, i.e., resembling the petal of a blue lotus, (Nymphaea stellata., Willd).
- 7. Arddhadhāra or a single-edged knife.
- 8. Sūci—needles.
 - Kuśapatra—a knife shaped like the kuśa grass (Eragostris Cynosuroides).

- Ātīmukha—a knife shaped like the beak of the Ātī bird (Turdus Ginginianus).
- Sararī-mukha—a pair of scissors like the beaks of Sararī bird.
- Antarmukha (lit. having internal sharp edge)—a kind of scissors.
- 13. Trikurccaka—an instrument consisting of three needles.
- Kuţhārikā—a small axe shaped instrument.
- 15. Vrihimukha-a trocar shaped like a grain of rice.
- 16. Arā or awl.
- Vetasa-patraka—an instrument shaped like the leaf of a rattan (Calamus Rotang).
- 18. Vadiša-an instrument shaped like the fish-hook.
- 19. Dantašanku or tooth-pick.
- 20. Eşani or sharp probe-like instrument.

According to Harita1 the twelve blunt instruments are-

Godhāmukha or iguana-faced.
 Vajramukha—grdhramukha?
 Tribaktra or three faced.
 Sandamsa or pincher.

गोधामुखं ववसुखं विवकृ नाम सन्दंशवकाक्षतिक इपादम्।
 श्यानकं प्रव्रक्तकुरू व्यव श्रीवत्ससीवत्सिक प्रव्यकः!
 इादशैतानि यन्ताणि कथितानि भियन्दरै:।
 श्य श्रव्याणि प्रीकानि नामानि च प्रयक् पृथक्।
 श्वरं चन्द्रं जीडिसुखम् कडपचं कुठारिका।
 करवीरकपवच श्रवाककरपत्रकम्।
 विद्रशं ग्राध्यादश्च ग्रवी च स्चिसुहरम्।
 श्रम्लाखेतानि प्रीकानि श्रव्यीश्चारे पृथक एथक॥

- 5. Cakrākṛti or circular shaped. 6. Anaka? 7. Kaṅkapāda?
- 8. Śringa or horn. 9. Kundala? 10. Śribatsa? 11. Saubatsika?
- 12. Pañcabaktram, i.e., five faced-simhamukham?

The twelve sharp instruments of Harita are-

1. Arddhaeandra or half-moon shaped. 2. Vrihimukha.

3. Kańkapatra. 4. Kuţhārikā. 5. Karavīrakapatraka. 6. Śalākā or sharp probe. 7. Karapatraka or saw. 8. Vadiśa or sharp hook. 9. Gṛdhrapāda? 10. Śūlī 11. Sūcī or needle. 12. Mudgara or hammer?

Vägbhaṭa II classifies the instruments in the following way:A. Blunt instruments—
I. Svastika, as heron, lion, bear, crow, deer
forceps &c. 24
II. Sandamśa: It consists of two iron

blades soldered at one end, the other
ends being free 2

(a) for extraction of eyelashes &c. ... 1
(b) mucutī

(a) Ekatāla 2

(b) Dwitāla 1

IV. Nādī or tubular: 23

(a) Kanthasalyavalokini or throat speculum having three and five holes ... 2

(b) Śalyanirghātanī 1

(c) For piles, different sizes for male and female ... 6

For inspection: 2 holes—rectal speculum 2
For medication: 1 hole ... 2

For applying pressure : entire-sami ... 2

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	Arddhendu or	half-m	oon shaped, for	hernia	1	
	Kolāsthidala i	or nasa	al polypus	***	1	
	Nail-shaped	7444			3	
(f)	For cleansing	***			T	3
	Rectum		***	***	1	
	Vagina	***			1	
	Urethra	***	2000	***	1	
(g)	Collyrium prol	be		***		1
				6		-
						34

VI. Anuyantra or accessory instruments are nineteen in number. To the list of Susruta he adds the following¹:—

Goat's gut, silk, time, suppuration, and fear.

B. The sharp instruments of Vāgbhaṭa are twenty-six in number.2

Mandalägra. 2. Vrddhipatra. 3. Utpalapatra. 4. Adhyarddhadhāra. 5. Sarpāsya. 6. Eṣaṇī:—Gaṇḍūpadamukhā and Sūcīmukhā. 7. Vetasa. 8. Śarārī. 9. Trikurcçaka. 10. Kuśapatra
 Ātīvadana. 12. Antarmukha and Arddhacandrānan.
 Vrīhibaktra. 14. Kuṭhārī. 15. Kuravakasalā. 16. Aṅguli-śastra. 17. Vaḍiśa. 18. Karapatra. 19. Kartarī. 20. Nakhaśastra
 Dantalekhana. 22. Sūcī. 23. Kurcca. 24. Khaja. 25. Ārā.
 Karṇavedhanī.

भनुयन्तास्त्रयस्तान रच्नु वस्ताऽम्म मुद्गराः। पद्मान जिल्ला वालाय शास्त्रा नस्त सुस्त दिजाः॥ कालः पाकः करः पादोभयं इपय तत् क्रियाः। उपायवित् प्रविभजेदालोच्य निपुर्या विद्या॥

Aşţānga Hrdaya, I. xxv.

श्रव्यक्तिः सुक्रमां रैर्थिटतानि वथाविधि । श्रक्षाणि रोमवाष्टीनि वाष्ट्रव्येनाङ्गुलानि घट् ॥ सुरुपाणि सुधाराणि सुग्रहाणि च कारयेत् । अकरलानि सुधात सुतौत्यावार्णतेऽधिस ॥ Bhāvamiśra mentions the following blunt and sharp instruments: Eṣanī, Jāmvousṭha Śalā,¹ Sūcī² and knives generally in making incisions which should be shaped like Kharjjūrapatrika, (like the leaf of Kharjjūra tree, Phœnix Sylvestris, Roxb.) Arddhacandra, Candravarga, Sūcīmukha and Abānmukha.³

Pālakapya* mentions ten kinds of šastras:—1. Vṛddhipatra.
2. Kuśapatra. 3. Mandalāgra. 4. Vrīhimukha. 5. Kuṭhārī.
6. Vatsadanta. 7. Utpalapatra. 8. Śalākā. 9. Śūcī or needles.
10. Rampaka. Besides these he refers to Vadiša.

Of the blunt instruments he mentions:—Jāmvobouṣṭha—(four in number, for application of actual cauteries), Simhadamṣṭrā, Godhāmukha, Kankamukha, Kuliśamukha—(for extraction of foreign bodies), Eṣaṇī or probes (three), wound syringe, Vastiyantra, Śalākā or rods, yaṣṭhiyantra, Karkataka, Dyātūha, Makaraka (crocodile), Śārddūlamuṣṭhika (tiger's claws), Nandimukha (Turdus Gingihianus).

- एषण्या गतिमन्त्रिष्य चारस्वानुसारिनीम् ।

 सूचौँ निद्ध्यादत्यन्ते प्रीव्राध्याय विनिष्ठरेत् ॥

 Bhāva Prakāša. II. iv., Nāḍī Vraņādhikāra.
- शागनाजि भिषपाङ्गी मस्त्रेणीत्कत्य यवतः । जास्वीडीनाप्रिवर्णेन तथ्या वा मलाकया ॥

Ibid, Bhagandarādhikāra.

गतिमन्त्रिय प्रस्तेण किन्द्रात् खर्ज्यूरपतिकम्।
 चन्द्रावे चन्द्रवर्गेच स्चीमुखमवासुखम्॥

Ibid.

4 तत श्रक्ताचि दशनामसंस्थानानि भवित । तद्यद्या इतिपत्तम्, कुश्रप्यम्, मस्त्रलायम्, त्रीष्ट्रमुखम्, कुठाराक्षति, वत्सदनम्, चत्पलप्यम्, श्रत्याका, स्वी, रम्पक्षेति । फालजास्ववतापिकादय्याक्षत्ययेति । एतानाधिककंविधाने चलारि चान्यानि श्रत्यवर्षानि यथायोगं सिंइद्रंष्ट्रं गोधामुखं कदमुखं कुलिशमुखं चेति । तिस एषिण्यः ।

Hastī Āyūrveda, III. xxx.

CHAPTER V.

DESCRIPTION OF THE BLUNT INSTRUMENTS.

Now we shall describe the instruments in detail. The Yantras or the blunt instruments will be considered first, and next the Sastras or the sharp instruments.

I. The Svastika yantra or Cruciform Instruments.

The word svastika is a technical term signifying one of the twenty-four signs of the Jinas; and it can be represented by two lines crossing each other, the arms of the cross being bent at their extremities towards the same direction. So these instruments may be described as cruciform. They have, as a rule a length of eighteen anguli. Their ends should be shaped like the faces of the following ferocious beasts (1 to 8), dear (9), and birds (10 to 24), and the instruments are to be called after their names.1 They are divided into two classes; the instruments of class I resemble the mouths of lion (simha) and tiger (vyagra), while class II comprises the instruments which have the likeness of the faces of birds of prey. The fulcrums of these instruments which are at the middle, are of the size of a masūra (Ervum lens). The handles are either rounded off, or bent at an angle at their ends, like an elephant driver's goad-the object being afford a good grasp of the instrument by the surgeon's hands. The svastika instruments are used for the extraction of

तत स्वतिवयनास्त्राष्ट्रशाहुलक्ष्माणानि सिंद्ध्याण्डकतरत्त्रस्यवीपिमार्जारस्यालस्यै क्वांदकताककदनुर्रवासमासम्भवायम् कविद्विद्योगस्यक्रीयसङ्गराजाञ्चलिकणावभञ्चननिद्यस्यस्यानि मन्तरक्षतिभिः कौलेरववद्यानि मृतिऽद्युगवदाव्यवार्वास्याद्यिविनटभ्राल्योद्यार्थस्यस्य ।

foreign bodies impacted in the bones.¹ If the foreign body is visible, extract it by the lion forceps or similar forceps of class I. If it is invisible, it should be extracted by the Heron forceps or similar forceps of class II. Of all the varieties of svastika instruments, the Heron forceps (kankamukha) is the best, for it can be easily introduced and turned in all directions, and also it grasps firmly and extracts a foreign body with ease and can be applied without any harm to all parts of the body.²

Class I :-

- Simhamukha svastika or Lion-faced forceps:—this
 instrument is said to have its mouth shaped like that of a lion
 (Felis leo). It is the principle instrument of the class I. It is
 - गुल्लानि कड सिंड च काकादिस्तपित्रणां। सुखैसुं खानि यनाणां कुर्यात्तत् संग्रकानि च ॥ षष्टादशाङ्ख्यासान्तायसानि च भूरिण:। सम्राकारपञ्जलेः कर्यदेवद्यानि कीलकेः॥ विद्यात् स्वस्तिक यनाणि मृलेऽदुश्रनतानि च। ते दृदें रिख्यसंलग्न शल्लाइरणनिश्यते॥

Aşţānga Hṛdaya, I. xxv.

इन्नः सिहमुखायेम् गृदं कडमुखादिमिः। निहंदेतु मनेः मन्तः मास्त्युक्तिव्यपेचया॥ विवर्त्तते साध्यवगाहते च मन्तः नियक्तीवरते च यसात्। यसेषतः कडमुखम् प्रधानं स्वानेषु सर्वोद्यधिकारि चैव॥

Suśruta Samhita I. vii.

निवर्त्तते साध्यवगाइते च गाद्यं ग्रहीलोहरते च यकात्। यसं व्यतः कडसुखं प्रधानं स्थानेषु सर्वेषधिकारि यह ॥ curious that in modern times, the European surgeons use a pair of forceps called the Lion foreceps for holding bones firmly during operations. So the Makaramukha of Pālakapya is the Crocodile forceps.

- Vyaghramukha or Tiger forceps: the mouth of this instrument is like that of a tiger (Tigris regalis).
 - 3. Vrkamukha or Wolf forceps (Canis lupus).
 - 4. Tarakşumukha or Hyena forceps (Hyena striata).
 - Rkṣamukha or Bear forceps (Ursus Americanas).
 - 6. Dwipimukha or Panther forceps (Felis pardus).
 - Mārjāramukha or Cat forceps (Felis domestica).
 - Śrgalamukha or Jackal forceps (Canis aureas).
 - Airbbāruka or Deer forceps (Cervus elephas).

Class II:—The birds, in imitation of whose faces the instruments of this class are made, can be identified from the following discription of their beaks:—

Birds: 1. Raptatories: they have curved beaks hooked at the extremity.

- (a) Strigidæ...owls...strong hooked beaks bent down from base.
- (b) Vulturidæ...vultures...long straight beaks bent down at tip.
- (c) Accipetridæ...falcons, osprey and eagle...short, usually dentated beaks, hooked at the ends.
- Pessaries...(a) Lanidæ...shrike...hooked and strongly serrated beak. (b) Cervidæ...crow and blue-jay...beaks strong, thick, somewhat curved anteriorly and slightly notched.
- 3. Grallatories...Heroidæ or Ardeidæ...herons and krauñca...they have long and powerful beaks with sharp hard

edges, somewhat curved at the point, rarely spoon-shaped, with long neck.

The instruments are-

- 10. Kākamukha or Crow forceps (Corvus corone).
- 11. Kankamukha or Heron forceps (Ardea cenerea).
- 12. Kuraramukha or Osprey forceps (Pandion haliæctus).
- Cāsamukha or Blue-jay forceps (Garrulous or Corvus cristatus).
- 14. Bhāsamukha or Eagle forceps.
- 15. Śaśaghātīmukha or Hawk forceps (Nanclerus furcatus).
- 16. Ulūkamukha or Owl forceps (Strix flammea).
- 17. Cillimukha or Kite forceps (Milivus ictimus).
- 18. Syenamukha or Vulture forceps (Vulture cinereas).
- 19. Grdhramukha or Falcon forceps (Peregine falcon).
- Krauñcamukha (Ardea jaculator); or Curlew (Numenius Arquatus).
- Bhṛṅgarājamukha or Fork-tailed or Butcher-bird forceps (Lanius excubitor).
- 22. Añjalikarnamukha-birds not identified.
- 23. Avabhañjanamukha " " "
- 24. Nandimukhamukha (Turdus Ginginianus).

II. The Sandamsa or Pincher-like Forceps.

The second class of instruments—the Sandamśa¹ or pincher-like forceps—comprises only two instruments: the forceps with and without handles. The first variety is likened

मनियश्वीऽनियश्य सन्दंशी पीङ्शाङ्गुली भवतस्त्रमांससिरासायुगतश्रव्योद्वारवार्थ-मुपदिश्चित ।

to forceps with arms, used by the barbers for depilating the nasal cavities, while the second variety is like the armless forceps used by the goldsmiths. The former consists of two arms joined crosswise by a pin fixed at about their middle points, and so really is a cruciform instrument but is classed here for its different use in surgery. The forceps without handles consists of two blades soldered at one end. Some commentators like to subdivide the pinchers into two classes according as their ends are rough or smooth. And so Hessler translates: "Duae forcipes denticulata et non denticulata".

The sandamsas are used for the purpose of extracting foreign substances from the soft structures of the human body, such as the skin, muscles, veins, nerves, and tendons². Generally they have a length of sixteen anguli.

Vägbhaṭa II mentions two other instruments as modifications of the type :—

(a) One variety has the length of six anguli. It is intended for the purpose of extracting minute foreign bodies such as thorn, hair &c. and of removing the superfluous eyelashes.³

Cakrapāṇi also advises us to use a sandamsa for epilation, which may be called the Epilation forceps.⁴

Aşţānga Hrdaya, I. xxv.

चितगुमच मलाच सन्दंगेन समुद्धरेत्।

Harita Samhita, III. lvi.

¹ Hessler's Suśruta. Caput vii. P. 14.

कोलवत वियुक्तायो सन्दंशी बीड्याङ्गुली। लकसिराखायुपिशित लग्न मत्वपकर्वत ॥ ४ ॥

यहबुक्तीऽन्वीहरशे स्का शस्त्री पपक्षणां ॥ ६ ॥

Aştanga Hrdaya, L. xxv.

^{*} See foot-note 2, p. 66.

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Susruta calls it Mucundi1, and uses it to hold the pterygium after it has been raised by vadiša or hook. It must be then a smaller variety of mucuți.

A similar pair of forceps, Dr. Erichsen mentions, and says2 that "for the purpose of extracting needles, thorns, splinters of wood and other foreign bodies of small size and pointed shape lying in narrow wounds, forceps with very fine but strong, wellserrated points will be found useful."

Suśruta mentions bamsabidala³ or bamboo forceps. It is made of a piece of bamboo rod, split longitudinally into two halves nearly to its whole extent. This is like the bamboo tongs used by the smokers in Bengal to raise glowing charcoal to the earthen bowl. It should be used to remove worms from the surface of the human body.

The sandamsa instrument may be compared with the modern dressing forceps and with the forceps still used by the goldsmiths, known as a sonna. Those with arms have their counterpart in he sadası or a pair of pinchers, still used by the blacksmiths.

III. Tāla Yantra or Picklock-like Instruments.

The third class of blunt instruments is called Tala-

थपाइं प्रेसमायस्य विद्यान समाहित:। सुंचुख्यार्गृ हा मेघावी सूचीस्वेण वा पुन: ॥

Suśruta Samhita, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342.

ताननुतैलेनाभाताम् वंशविद्वीनापहरेत्।

Suśruta Samhita, IV, xxvii.

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Aştānga Hrdaya, I. xxv.

वित्रप्रव मन्द्रीन समुद्रित्।

Harita Samhita, III. Ivi.

¹ Hessler's Suśruta. Caput vii. P. 14.

कौलवत वियुक्ताची सन्दंशी वीड्याङ्गुली। लकसिराखाद्यपित्रित लग्न प्रत्यपकर्षेते॥ ॥ ॥

पङ्खीऽचीहरचे म्झ क्यी पपछावां ॥ ६ ॥

Aşţānga Hrdaya, L xxv.

^{*} See foot-note 2, p. 68.

Similarly in modern times, we remove superfluous eyelashes by the Epilation forceps. Mr. Berry writes¹:—"When the trichiasis is only partial, a temporary improvement is obtained by epilation. In some cases where a few eyelashes only have been left altogether, the patient may procure for himself a pair of forceps, and have the eyelashes removed whenever they cause irritation." Surgical epilation was frequently necessary for trichiasis among the Romans and a similar forceps was in use there.²

In ancient times in India, the barbers used epilation forceps for pulling out grey hairs. In Makha-deva jātaka, we find the following conversations between the king and his barber³:—

"Barber. There is a grey hair to be seen on your head, O King."

King. Pull it out, then, friend, and put it in my hand.

So he tore it out with golden pinchers, and placed it in the hand of the King."

(b) The second variety is known as the Mucuți instrument. It is a pair of straight forceps, having no curve like that o the sandamsa. It is serrated finely at the open ends. The soldered end has a ring attached to it as ornamentation. It recommended to be used for removing painful sloughs and programulations from a deep-seated abscess. It is also to be used

Practical Ophthalmology, 1904. By G. A. Berry, M.B. P. 52.

² Paulus Ægineta, VI. xiii, (Syd. Soc. Ed.)

^{*} Rhys David's Buddhistie jätaka stories, Vol. I, pp. 187.

मुनुटी सूद्धा दलर्जुमूल क्वकभूषणा।
 गशीर जगमांसात्ती चार्माण: प्रीवितस्य च ॥ ७ ॥

complete the operation for pterygium by removing the remnant, after it has been extirpated by the sharp instruments. Susruta calls it Mucundi¹, and uses it to hold the pterygium after it has been raised by vadisa or hook. It must be then a smaller variety of mucuți.

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चपाङ्गं प्रेचमाचस्य विष्ठीन समाहित:। सुचुच्छार्गृ झ मेघावी स्चीस्चेण वा पुन:॥

Suśruta Samhitā, vi. xv.

Erichsen's Science and Art of Surgery, Tenth Ed. vol. I. p. 342. ताननुतेलेलान्यक्रमा वंश्वविदलेलापहरेत्।

Sufruta Samhita, IV, xxvii.

yantra¹. The word tāla "has been differently intepreted by the commentators. Bhānumatī gives the alternative reading (tālu i.e., palate) for tāla, so the instruments likely had their ends shaped like the palatine process of fish. Dallana, however, maintains that tāla means picklock, the ordinary Indian key which resembles a hook. Two of these are joined at one end, the curved ends being kept free, facing one another. The instrument would then resemble the face of a bhetuli fish. Instruments with one tāla or hook resemble one lip of the fish, and those with two tālas represent its entire face. Both Cakrapāṇi and Dallana however prefer to mean by tāla, the scale of a fish."

They have a length of twelve anguli, and are shaped like the jaws of a fish. They may be made either with a single blade (ekatāla) or with double blades (dvitāla) soldered at one end, the hooked ends being free. They are intended for the purpose of extracting foreign bodies from the ear, nose and other outer canals of the body. The ear scoop now used by the barbers of India for extracting wax from the ear is a tālayantra.

ग तालयन्त्रे दादशादुः सन्स्थतालुबद्कतालिंदतालके कर्यनासानाङ्गीश्रव्यानामा-इरयार्थं।

Suśruta Samhita, I. vii.

हे हादशाहुले मत्स्यतालुबद्देश्व तालके। ताल यन स्मृते कर्यानाडी श्रव्यापहारिणी॥

Aştānga Hrdaya Samhitā, I. xxv.

अत ताल मध्येन प्रदेम उच्यते। एतेन एकं तालं प्रदेशी यस्य तदेकतालं, हे ताले प्रदेशी यस्य तत् वितालकमं; एतेन मत्सास्य मल्कवत्प्रतनुमुखं एप्रदेशं एकताल मत्साम्यक्रकवत् प्रतनुमुखं विप्रदेशं वितालमिल्कृकम्। परिचाइन्तु कर्णादिप्रविशी ज्ञेय:। असे तु मत्सातालकवदेकतालकवितालक इति पठिला। व्याख्यानयित च मत्साद्रव भेटुनिमत्स्य:, तस्य लौइमयतालकाकारं मुखं भवित चत्त्वम्युखार्डाकारं यन्त्रमेकतालकं, सर्वमुखाकारं दितालकं, तालकोऽवज्यपवारकादिपाटसस्विवन्यनं लौइमयमुच्यते।

Dallana's Commentary, I. vii.

For removing substances that have fallen into the meatus auditorius, Paul says: "They must therefore be extracted by an earpick, a hook, or tweezers, or by using powerful shaking of the head, while the ear is placed upon some circular board." Albucasis recommends us to use a slender forceps, which resembles the modern dissecting forceps. He also commends for the purpose a hook slightly bent, which is also mentioned by Celsus.²

IV. The Nādī Yantra or Tubular Instruments.

The Nadi or tubular instruments are described to be of various kinds and to serve many purposes³. They are open either at one or both ends. These are used for the extraction of foreign substances from the natural outlets of the body. They are also recommended to be used as a diagonostic apparatus for inspection of diseases in the canals. They are the means of sucking out fluid discharges, as pus etc., from cavities and they facilitate the performances of other operations. They vary in length and diameter in proportion to the different sizes of the outer canals of the body, or according to the varieties of purposes to be served by them.

Suiruta Samhitä, I. vii.

नाडीयनाचि प्रविराखे कानेक मुखानि तु। चीतीगतानां प्रव्यानामामयानाच दर्शने। क्रियाचां सकरताय कृथादाचूषणाय च। तिव्याचा परिचाइ देखें चीतीऽनुरोधतः॥ १॥

¹ Paulus Ægineta, Vol. II. VI. xxiv. (Syd. Soc. Ed.)

Celsus, VI.

अ नाङ्गी यनाष्यनेकप्रकाराख्यनेक प्रयोजनान्येकतीमुखान्तुभयतीमुखानि च तानि स्रोती-गतश्रखीद्वारणाय रोगदर्शनार्दभाष्य्रणार्थं क्रियामीकाश्रावांचिति तानि स्रोतदारपरिणाङ्गानि ययायीग परिवाइदीघाँणि च।

The tubular instruments are used for fistula-in-ano, haemorrhoids, tumours, abscesses, injections into the rectum, vagina and urethra, hydrocele, ascites, inhalations, stricture of urethra and rectum and cupping as by gourd and horns.¹

As examples of the tubular instruments, Vagbhaṭa II.
mentions:—

1. Kanthasalyāvalokinī" or throat speculum.

To examine foreign substances such as a fish-bone in the throat, the instrument should have a length of ten anguli and a circumference of five anguli.

Susruta describes the extraction of a foreign body, made of lac from the throat of a patient by the following device. A heated iron probe or sound should be introduced into the throat of a patient through a tube of copper and made to touch the bit of shellac. The foreign substance would begin to dissolve or soften and so will adhere to the probe. The rod is then to be cooled by sprinkling water through the tube and the foreign body then should be drawn out steadily with it. But other kinds of foreign bodies are to be extracted from the throat by means of a rod-like instrument, one end of which is smeared with melted wax or shellac.

The use of some adhesive substance for extraction of foreign bodies accidentally introduced into the outer passages of the

भगन्दराणोंऽर्व्यत्ववन्ताः त्तरवित्तम् वहविदकोदरघूमनिश्वप्रकाशस्त्रिश्वगृदयनात्वः
 लावूग्रव्यनाचि चीपरिष्टावच्यामः ।
 Suéruta Samhita, I. vii.

दशाहुलावेनाकाना. कच्छमत्वावलीकिनी।
Astanga Hrdaya, I. xxv.

[ै] जातुषे करहासको करछे नाड़ी' प्रवेश्याप्रितप्ताच श्लाको तथावगृद्ध श्रीताभिरिद्ध: परिषिच स्विरीभृतमुद्धरित्। अजातुषं जतुमधूष्टिष्टलिप्तया श्लाकया पूर्व्वकःपेनेत्येकै । Suáruta Samhita, L xxvii,

human body was well known to the Greeks and Romans. Paul says: "Stones and such like bodies we extract by wrapping wool round an earpick, and smearing it with turpentine-rosin, or some glutinous substance, and introducing it gently into the meatus auditorius."

2. Pancamukha and Trimukha.

To take a good hold of a four-eared arrow, a speculum having five holes (PANCAMUKHA) should be had recourse to; and for a two-eared arrow, a speculum having three holes (TRIMUKHA) would be necessary. The central hole is for the arrow, while the side holes are meant for the ears of the arrow.²

Celsus³ says that when a weapon buried in the flesh has barbs too strong to be broken with forceps, they may be shielded with split writing-reeds (Calamus scriptorium), and the weapon thus withdrawn.

Paul says: "Some apply a tube round about the barbs' so that when they draw out the weapon, the flesh may not be torn by the barbs."

In modern times a snare is used instead of a tube. Dr. Erichsen⁵ writes: "The extraction of an arrow is usually attended with little difficulty. But if barbed, special precautions have to be taken. With the view of safely effecting its removal, the snares.....have been devised."

Aşţānga Hṛdaya, I. xxv.

Paulus Ægineta, Vol. II. VI. xxiv. (Syd. Soc. Ed.)

नाडोपथमुखिक्ड्रा चतुक्कर्णस्य संग्रह । वारङस्य दिक्कर्णस्य चिक्क्ट्रा तत् प्रमाणतः ।

^{*} Celsus, vii. v.

The Works of Paulus Ægineta, vi. lxxxvii.

^{*} The Science and Art of Surgery. Vol. I. pp. 343.

3. Tubular Instruments for Inspection of Arrows.

Again for the inspection of the arrows, various kinds of tubular instruments would be necessary, which will vary according to the shape, length, and circumference of the arrows and their ears.¹

4. Śalyanirghātanī.

The top of this tubular instrument is shaped like the disc of a lotus and is closed. The other end is open and leads to a hollow extending to a fourth part of the tube. It has a length of twelve anguli. It is useful for removing an arrow fixed deeply into the body, in different directions and thus helpling its easy extraction.² For this purpose Susruta directs us to use a stone hammer.

The Śalyanirghātani had its counterpart in the female part of the Impellent, mentioned by Paul, for forcing an arrowhead forwards through a part so as to extract it at the side opposite to that of its entrance. It would thus be seen that the function of the Impellent was similar to that of the Śalyanirghātani; the former moved it forwards, while the latter moved the śalya side to side, the object of both being to extract the foreign substance. The Impellent would seem to have been a plain rod of metal pointed at one end (the male part) and hollowed at the other (the female part); the pointed end used to be introduced into the socket of an arrow when it possessed one, and the hollow

वारङ्ग कर्षसंख्यान नाइ देध्यानुरीधतः। नाडौरवं विधायान्या द्रष्टुं भळ्याचि कारचेत्॥ १०॥

Aştanga Hrdaya, I. xxv.

पद्मकाणिकया मृद्धिं सहमी वादमाहुला। चतुर्थं समिरानाङ्गी मलानिर्धातनी मता॥

end was meant to fit over the tail in case where the arrow was tanged.¹ The Greeks and Romans recognised the necessity of an arrow being moved about until loosened, if it remained fixed in the bone; and Celsus² directs us to strike it with some iron instrument until it be shaken from the place where it is lodged.

5. Tubular instruments for piles.

According to Suśruta³ these should be made either of iron, or ivory, or horn or wood. They are hollow instruments tapering at the end which should be shaped like the teat of a cow. For males, the length is four anguli, while the circumference is five anguli. In the case of females, however, the tube should be made wider, the circumference being six anguli, and longer, the length being equal to the space covered by the palm of the hand. There are two slits on the sides—one for inspection of diseases and the other to allow application of caustic and cautery to the diseased part. The slit measures three anguli in length and the pulp of the thumb in breadth. At a distance of a half anguli from the margin of the slit, is raised a circular projection, also a half anguli high.

¹ Paulus Ægineta, VI. lxxxviii.

² Celsus, VII. 5.

⁵ तच यन' लीइं दानं शाई वाचे वा गीसनाकारं चतुराहुलायतं पथाहुलपरिणाइं पुंसी यङ्कुलपरिणाइं नारीणां तलायतं तद्दिच्छिद्रं दर्शनार्थमकं व्हिट्सकं व्हिट्सन् कर्मणा। एकदारे हि शक्तचाराधीनामितिकमी न भवति। व्हिट्समाणन् वाहुलायतमहृष्ठीदर-परिणाइं यददुलमविश्चं तस्यादाहुलमधसादवांहुलीक्तिपरिश्चनकर्णिकमेषयनाकृति-समासः।

Vagbhața¹ describes two different instruments, one for inspection and the other for medication. They both have the same length and circumference. The former has two slits on the side, while the latter has only one slit, three anguli long and the pulp of the thumb in width. The annular projection is turned upwards: the object being the prevention of sudden introduction of the instrument too far inwards.

A similar instrument without any slit on the side is called Samī². It is advised to be used for exerting pressure over the piles by its introduction into the rectum (Vāgbhaṭa.)

Rectal speculum is mentioned by Hippocrates in his treatise on fistula and by Paul in the treatment of piles. It is called Calopter in contradistinction to the vaginal speculum which is called Diopter. The rectal speculum in the Naples museum is a two bladed instrument working with a hinge in the middle. In modern times, both the varieties of the speculum, tubular and valved, are in use.

For inspection and medication of piles, a tubular speculum is recommended to be used by the veterinary surgeons. In the

Aştānga Hrdaya Samhitā, I. xxv.

भर्मसं गीसनाकारं यसकं चतुरहुलम्। नाई पचाहुलम् पुंसां प्रमदानां चड्डुलं। विक्टिट्रं दर्गने व्याधेरैकक्टिट्रन्त कर्माण। मध्येऽस्य चाहुलक्टिट्रमङ्कतोदर विसृतम्। अवाहुलोक्टितीवृत्त कर्यिकच तट्ट्रवृत:॥

² श्रम्याच्यां ताडगच्छिद्र' यन्तमर्श: प्रपीडनं ॥ १३ ॥

Ibid.

³ The Genuine Works of Hippocrates. (Syd. Soc. Ed.) Vol. II. P. 817.

^{*} Paulus Ægineta, VI. lxxix.

Aśvavaidyaka, Jayadatta sūri¹ describes the instrument thus: "The surgeon should know the instrument to have the length of six aṅguli. On the two sides, the wise surgeon should make two slits, three aṅguli long and a half aṅguli broad. Through an instrument with two slits, the piles of the horses should be examined. Through a speculum with one slit, the surgical operations, such as incisions &c., should be performed, after having tied the horse and making him lie down".

6. TUBULAR INSTRUMENTS FOR FISTULA-IN-ANO.

These are similar to the instruments used for the inspection and medication of piles, the only difference being the omission of the circular rings in their construction, for otherwise, the projection may rub over the sore if the speculum be introduced deeply.²

> यन परुष्टु ने विद्यान् चिद्रं पचाहुनं भिषक्। अधीऽतां हुलाविसीणे देखेणायह लवसम्॥ उभयो: पार्ययोक्तस्य कुर्याच्चिद्रवयं वृधः। अगैसीन तु वाहस्य विच्छिद्रेण विलोकयेत्॥ एकच्छिद्रेण वे कम्म कुर्याच्छेदादि पूर्वकम्। पातितस्य सुवद्वस्य तुरुष्टस्य विचचणः॥

> > Aśvavaidyaka (Bibliotheca Indica). Liii. vs. 4, 5 and 6.

किट्राट्वं इरिटी हमग्रैयलस्य यनवित्। तती भगन्दरे द्वादेतदर्शेन्द्र मझिभं॥

Suáruta Samhita, IV. viii.

सञ्चाऽपनयदीष्टं किद्रादृतं भगन्दरे।

7. TUBULAR INSTRUMENTS FOR THE NOSE.

Nasal-Speculum.

Similar tubular instrument without ring is to be used for examination of nasal diseases as tumours and polypus. It is however shorter and thinner than the rectal speculum. Vagbhaṭa says: "It is two aṅguli long and admits the index finger in its lumen. The tube has a single slit on the side."

He describes nasal tubes for introducing medicated powders into the nose as snuff. ² After partially filling the tube with powders, one should blow through the empty end, the other end being put well inside the nasal cavity. Suśruta also uses a tube to blow powder into the nose. ³ Caraka ⁴ mentions nasal insufflation to cure diseases. Śārngadhara ⁵ and Cakradatta ⁶ describe the nasal tube for insufflation to be six anguli long and open at both ends.

- े प्राचार्व्यक्ष्मिमिकच्चिद्रा नाबाद्विज्ञवया। प्रदेशिनी परिचाहा स्याहनन्दर यनवत् ॥ १५ ॥ Astanga Hrdaya, L xxv.
- भानं विरेचन पूर्णी युक्तात् तं सुख्वायुना । षङ्गुलविसुख्या नावा भिषजगभया ।

Ibid. L xx.

- गासासाव प्राणतवृर्णमुळं नाबादियं यीऽवपीइवतीचा: । Suāruta Sanhhitā, VI, xxiii.
- 4 सिद्धिं स्थात्रावनं चूर्यांचयां प्रथमणे दितं । Caraka Samhitā, VI. xxvi.
- वड्कुचा दिवजा या नाडी चूर्णनयी धर्मत्। तीचां कीलमितस्वकु वात: प्रधमनं दितं ॥ Śarńgadhara Sarngraha, III viii.
- श्वापनं रिचनधूणी युद्धात् तत् मुखनायुना ।
 षडणू ल हिमुखया नावाा भेषजगर्भवा ॥
 Cakradatta, Nasyadhikara.

Aretaeus says that a quill or reed or a wide long tube may be used for blowing powders into the pharynx. Alexander Trallianus² says that a calamus scriptorium, the joints of which have been removed, may be used as an insufflator. Oribasius³ however gives the fullest description of the tube used as a nasal insufflator. "A reed slender and with a straight bore, 6 inches in length, and of such a size that it can be passed in the nares, is taken and its cavity entirely filled with medicament. The reed may be either natural or of bronze. This being placed in the nares, we propel the medicament by blowing into the other end."

In modern times, we advise our patients to do the same thing when powders are prescribed to be thrown into the nose or ears. The cylindrical shaft of the ordinary quill so cut as to be open at both ends will serve the purpose admirably. The nasal insufflator is used now for identical object.

Aretaeus⁴ mentions a nasal syringe with a double tube. It consists of two pipes united together by an outlet so that liquid medicine may be injected into both the nasal cavities simultaneously, for injection into each nostril separately, he points out, can not be borne.

It is remarkable that in Mahāvāgga⁵ mention is made of single and double nose-spoons. Nāthu-karaṇi (i.e., an instrument to hold up the nose, so that the medicated oil

Aretaeus, Vol. II., P. 408.

^{*} Alexander Trallianus, IV. viii.

³ Oribasius Collect, xii.

^{*} Aretaeus, Ed. Adams, Vol. II., P. 459.

Mahāvāgga, VI. 13, 1 & 2. Sacred Books of the East.

does not run out...Ed.) and Yamaka-nāthu-karaṇi (i.e., one that would go up both nostrils...Ed.). They are recommended to be made of gold, or silver, or bone, or ivory, or horn, or of the nala reed, or of bambu, or of wood, or of lac, or of the shells of fruit, or of chank-shell". (Sacred Books of the East).

To apply oily medicines inside the nasal cavity a cotton wick is first soaked in the oil and then it is pushed well inside the nose. It is recommended also to pour oil into the cavity through a tube, while the other cavity is pressed by a finger (Vāgbhaṭa¹).

To treat a case of fracture of the nasal bones, Susruta recommends² two straight tubes open at both ends to be introduced into the nasal cavities, after putting the fractured ends in position, either lowering or elevating the raised or depressed end by a rod as required. Then bandages are to be applied. The tubes serve as splints to support the broken ends in position, while through their orifices the patient may breathe without inconvenience.

Similarly Celsus, after replacing the fractured ends in position uses oblong tents sewed round with a thin soft skin as splints into the nostrils; or a large quill smeared with gum, or artificer's glue may be applied in the same way. Paul also

Aşţānga Hrdaya, L xx.

नासापुटं पिघायेकं पर्यायेख निषेचयेत्। जचास्त भेषकं प्रनाद्या पिचुनाऽयवा॥

नासां सन्नां विक्षणां वा ऋण्यों कला भलाकया। पृथ्य नासिकयीनाची दिसुखी संप्रवेभयेत्॥ ततः प्रदेन संवेटा इतसेकं प्रदापयेत्॥

says: "And some sew the quills of the feathers of a goose into the rags, and thus introduce them into the nose, in order that they may preserve the parts in position without obstructing the respiration; but this is unnecessary as respiration is carried on by the mouth."

Suśruta also advises us to introduce these tubes into the nasal cavities during the performance of the Rhinoplastic operations.²

8. THE ANGULI-TRANAKA OR FINGER-GUARD.

Vāgbhaṭa says: "It is generally made either of ivory or wood. The instrument is shaped like the teat of a cow, and is four anguli long. Two slits occur on the sides like those in the speculum for piles."

It protects the finger of the surgeon from being injured by the teeth of the patient and so helps the surgeon in opening the mouth of the patient with ease.4

In modern times, finger-guards are used for the same purposes.

- Paulus Ægineta, Vol. II. vi, xei. Syd. Soc. Ed.
- मसंहितं सम्बन्धो यथावद्वाहीदयनाभिस्मीचा वहा । प्रीव्रम चैनामवच्चयेव पलद्वयटीमपुकाछनेव ॥

Susruta Samhita, I. xvi.

अङ्गुलिचायकं दानां नाचे वा चतुरङ्गुलस्।
हिच्छिद्रं गोसनाकारं तदक्षविक्तौसुखं॥

Aştānga Hrdaya, I. xxv.

तच वक्ष विवृतो, सन्तृत मुखस्थातुरस्य मुख्यादान निमित्तं मुखं मुखकरं स्थात्। यत इदं दनधातात् रचित धत उक्षं मुखमिति।

Vagbhatartha Kaumudi, I. xxv.

भक्र विदंनीमी रचगार्थतांदक् विचागमिति नाम।

Sarvānga Sundarī, I. xxv.

9. Joni-vraneksana or Vaginal Speculum.

Vāgbhaṭa¹ describes it to be a tubular instrument, sixteen anguli long, and six anguli in circumference. It consists of four blades, attached at their bases to a ring. The tube tapers gradually, the end is free and looks like the bud of a lotus. To the four blades are soldered four rods in such a way that on pressing their free ends, which pass out of the ring, by the surgeon's hands, the tapering end of the tube would gape widely. The surgeon by regulating the pressure of his hand, may open or close the speculum to any desired extent.

Another kind of vaginal speculum used to be manufactured out of the two horns of a buffalo by dividing each into two longitudinal halves. They should be so paired that their concave surfaces would look towards one another, their ends diverging outwards. So we get a pair of bivalve speculum out of a pair of horns.

The bivalve speculum of horn mentioned above, has its modern counterpart in the pair of speculum known as Barne's or Neugebauer's speculum.

> योनिव्रवेश्वयं मध्ये ग्रविरं घोड्णाङ्गुलम्। मुद्रावदं चतुर्भित्तमधील मुकुलाननं। चतुःशलाकमावानं मृले तदिकसैन्युखे॥ १०।

Aşţānga Hrdaya, I. xxv.

षस्य यनस्य कन्यनायां चलारिखन्यानि तथा कार्याण यथा मुद्रिकया वद्यानि निलितानि च पद्ममुक्कलाकार मुखा, अनर ग्राधरा षड्झुल परिचाइवती नाड़ी स्वात्। ततसन्त्राध्ये प्रत्येक खन्यसंलग्न चतसः जलाकाः भामुखात् सिक्षवेम्य अलाकानामध्यभागे तथा वधीयात् ग्राथा श्राकामूल पीड़नेन यनस्य मुखं विकसेत्।

Vágbhatartha Kaumudi, I. xxv.

The vaginal speculum or Diopter is mentioned by Soranus, Paul¹ and other Greek surgeons. Paul describes its method of working as follows:- "The person using the speculum should measure with a probe the depth of the woman's vagina, lest the stalk (fistula) of the speculum being too long, it should happen that the uterus should be pressed upon. If it be ascertained that the stalk is larger than the vagina, folded compresses are to be laid on the alæ pudendi, in order that the speculum may be placed upon them. The stalk is to be introduced, having a screw at the upper part, and the speculum is to be held by the operator, but the screw is to be turned by the assistant, so that the laminæ of the stalk being separated, the vagina may be distended." The accounts given by Albucasis2 and Haly Abbas5 are similar. These instruments are described to be bivalve, trivalve or quadrivalve. A quadrivalve speculum of the Greeks is identical with the Joni-vraneksana of the Hindus; the only difference being that the former is acted by screw mechanism, while the latter is worked on the principle of the lever. Drawings of several shorts of the Greek instruments are given in the surgery of Albucasis and by Schultet.4 There are three specimens of vaginal, speculum in the Naples museum, drawings of which are given by Milne. In modern times, we use similar valvular speculum for identical purposes.

¹ Paulus Ægineta, Vol. II. vl. Ixxiii. Syd. Soc. Ed.

^{*} Albucasis, Chirrog, II. 71.

² Haly Abbas, Pract. ix. 57.

Arsenal de chirrug, tab. 18.

Tubular Instruments for wounds. Vrana-vasti or Wound-syringe.

If the wound be caused by deranged air and be very tender, especially if it forms on the lower half of the body, the vasti should be used. In diseases of the urinary organs, such as, obstruction of urine, faulty conditions of urine, impure semen, stone in the bladder and disorders of menstruation, uttara-vasti is necessary.

There are two instruments mentioned—one for application of oleaginous medicines to a sore and the other for washing a sinus with medicated lotions. Each consists of a tube and a leather bag. The tube is smooth and rounded and is shaped like a cow's tail.² It is six anguli long. The base is broad and admits a thumb, while the end is narrow and admits a pea. There is a circular projection or ring at a short distance from the end. The base is fitted tightly into a bag of thin leather.³

वातदृष्टी वर्षीयम् कचायत्यर्थवेदन:। यथ:कार्य विशेषेण तत विभिन्नेशीयते। मृताघाते मृतदोषे ग्रकदीविऽमरीवर्ण। तथैवार्णवदीषे च विसर्याचरी हित:॥

Suŝruta Sambita, IV. i.

 नाड़ी बचानां खेडप्रयोगार्थं प्रचालनार्थय हे यन्ते चाह यन्ते दत्यादि नाड़ीबणान्थक्क चालनाय नाड़ीबणानानन्थकार्थं प्रचालनार्थय घड़कूने घड़कून दीघें, बिसयन्वाकृति बिस-नेताकारे उत्ते गीपुच्छाकारे

Vägbhaţārtha Kaumudī, I. xxv.

यन्त्रे नाडी त्रशास्यकः चालनाय घडकुर्ते । विस्तयन्त्रकती स्लिऽङ्गतः कलायवि । असतः कशिकं सूने निवतस्युचर्यशी॥ १८ ।

Aştanga Hrdaya Samhita, I. xxv

To prevent the tube slipping out of the bag, an additional precaution is taken by tying a knot of thread over the leather covering the tube. For description of the bag, vide infra.

Śārṅgadhara¹ however says that the tube should have the thickness of the shaft of a vulture's feather and should admit a moong (Phaseelus Moong). It is eight aṅguli long.

Pālakāpya describes the tube for washing wounds of elephants to be made of copper, and shaped like the karontaka flower. It is sixteen anguli long.

In modern times, wound syringes are similarly used to wash the sore with medicated lotions.

For description of the tubes for vrana-dhupana or woundfumigation, vide infra.

11. TUBULAR INSTRUMENTS FOR ASCITES.

Dākodara yantra or Canula.

It may be either metallic or manufactured from the cylindrical hollow calamus of a peacock's feather.² The tube is open at both ends and is of the same calibre throughout. Susruta advises us to use a pipe of tin, or lead or a feather to drain the fluid, after the abdomen has been tapped.³

> व्यवसोस्त नेतं स्थात् ब्रज्यसटाङ्गुलीयमतम् । सुद्गच्छिद्रस्थायचनलिकापरिणाहि च ।

> > Śārngadhara Samgraha, III. vi.

² विदास निखका पिच्छनिलका वा दाकोदरे। १८।

Aşţānga Hrdaya Samhitā, I. xxv.

तत्र त्रवादीनामन्यतमस्य नाडीविद्यारां पचनाङी वा संयोज्या दोषोदक-भवसिचेचतो नाडीमपङ्ग्य तैललवयेनाभज्य त्रणवन्धेनोपचरित ।

Suśruta Samhita, IV. xiv

Ceisus describes a lead or copper canula for draining ascites.

Paul writes that the tip used to be bevelled off like a writing pen.

It was also employed in empyema.

Albucasis mentions a tube of silver or copper or brass having a small hole at the bottom and three on its sides.

In modern times we use a metallic canula of similar shape for draining fluid in ascites.

12. TUBULAR INSTRUMENTS FOR HYDROCELE.

This is practically the same instrument described above. Susruta⁵ mentions a tube or canula to drain the fluid after tapping the hydrocele with the vrihimukha sastra or trocar. The Greek surgeons did not describe the operation. They preferred the open incision to puncture.⁶ Rhases, however, describes the operation of puncturing the scrotum for hydrocele.⁷

13. TUBULAR INSTRUMENTS FOR URETHRAL STRICTURE.

Susruta recommends gradual mechanical dilatation of the urethraby means of tubes made of iron, or wood, or lac, well-smeared

Suśruta Samhita, IV. xix.

¹ Celsus, vii. 15 &, ii, 10,

² Paulus Ægineta, Vol. II. VI, L. Syd. Soc. Ed.

³ Hippocrates, ii. 259.

[·] Albucasis, Chirrug, ii. 54,

मृतजां स्वद्यित्वातु वस्तप्रदेन वेटयेत् ॥
 सेवन्याः पार्वं तोऽधसा विध्येद्वीविमुखेन च ।
 प्रथात विमुखां नाडौँ दला विस्तावयेट भिषक् ॥

e Paulus Ægineta, VI, lxii.

⁷ Rhases, Cont. xxiv.

with ghee. He advises us to use the same tube for three consecutive days, then another of larger calibre for three days more, and so on, till the canal be fully dilated. He reserves External Urethrotomy as a last resource. 2

14. TUBULAR INSTRUMENTS FOR RECTAL STRICTURE.

Suśruta similarly describes gradual dilatation of stricture of the rectum, using a higher number of diliators after the lapse of three days until the desired effect is attained.

- (a) निरुद्धप्रकाशि नाडौँ लीडीसुभयतीसुखाँ॥ दारवी वा जनुकता ध्रतास्वका प्रविध्यति। परिषेक वसामच्च शियमारवराड्योः॥ चक्रतेलं तथायोज्यं वातश्रम्यसंयुतं। वाडाच्याडान् स्यूलतरां सम्यङ्नाडौँ प्रवेशयित्॥ योतीविवर्डयेदेवं खिग्धमन्नच भोजयेत्। भिलावा सेवनीं सुक्कां स्यःचतवदाचरेत॥
 - Susrpta Samhitä, IV. xx.
 - (b) निरुद्ध प्रकाश नाड़ी विमुखीम् कनकादिजम्। चित्रामका चुबुकादिखेडेन परिवेचयेत्। तैलीन वा वचदारकके: मिडेन च बाहात्॥ पुन: स्यूलतरा नाड़ीदिया सीतोवित्ववये।
 - ··· • कत्रपदिऽप्येष कियाक्रम: ॥

Cakradatta, Kşudraroga Cikitsä. See also Yogaratnäkara, P. 368, where these verses are quoted.

* See I (a). चंस्वार्थ: - सैवनीं त्यका शसीण वा स्वस्रोत: संकोचकारण चंस् विदार्थत्। तस्वापि बारस्वाविपाटे सिणाशस्मध्ये थे दास्यिदिति।

> Commentary of Srī Kantha in Vyākhyā Kusumūvalī (Anandāsram Series), P. 406.

मित्रका गुद्दै योज्या निक्तप्रकाणिकया ॥

Sušrpta Samhitā, IV. xx.

There is no mention of solid bladder sounds in the Sanskrit medical books. But from the above descriptions, it seems beyond-doubt that they had a set of dilators for stricture of the urethra and another set of dilators for stricture of the rectum. These dilators were tubes—either metallic or wooden—and had a regular gradation in the increse of their diameters. Cakrapāṇī mentions stricture dilators of gold.

In modern times we have also two sets of these instruments

—urethral and rectal dilators, numbered in an ascending series
according to the increased diameters of these instruments.

Tubular Instruments for Injections into the Rectum. Vasti yantra or Rectal Clyster.

Injections into the rectum are to be thrown by means of a tube with a membranous bag tied to its end. The tube is advised to be made either of gold, or silver, or lead, or copper, or brass, or bell-metal, or ivory, or horns, or glass, or precious stones, or wood or bamboo. It should be clean, smooth, strong, and tapering like a cow's tail, and should terminate in a smooth rounded bulb. The tube varies in length and circumference according to the age of the patient as follows:—

I. Caraka."

Age.	Length of tube.	Opening at the end admits.
6 years 12 20 ., and over	6 anguli 8 " 12 "	A moong A pea A small plum seed

¹ See foot note I (b), Page 124.

मुवर्णस्यात्रपुतासरीति
कांस्यायसास्थिद्वमवेणुदली: ।
नलिविंधाणैर्मीणिभिय तेसी:
कार्य्याणि नेताणि मुकर्णिकानि ॥

	-	A	
11	81	ISTI	ıta.1

Age.	Length of tube.	Part of tube in bag.	Circumference of tube.	Circumference at end.	Measure of injection.
1 year	6 anguli	1½ anguli	Little finger	Shaft of he- ron's feather.	2 añjali
8	8	2 ,,	4th	Shaft of fal- con's feather.	4 .,,
16 "	16 "	31 "	3rd "	Shaft of pea- cock's feather.	8 "
50 " 70 "	Same as	3 Pulp of thumb		Admits a plum stone.	

पङ् बादशाराङ्ग्ल समितानि पङ् विंशतिबादशवर्षजानाम् । स्युमुद्रककेन्यु सतीनवाहिष्किद्राणि वर्त्यापिहितानि चापि ॥ यथावयीऽङ्गुरु कनिष्ठकाभां म्लाययी: स्यु: परिकाहवनि । स्युनि गोपुष्कसमाकृतीनि: यचानि च स्युगुङ्कितासुस्यानि ॥ स्यात् कणि कैकाय चतुर्यभागि म्लायिने वस्ति निवस्तने हे । जारङ्गोमाहिषहारिणो वा स्याष्कीकरो वस्तिरजस्य वापि ॥ इट्सनुनैद्यारो विगन्धः कषायरकः सुसदः सुयदः । दृणां वयोवीद्या यथानुहुपं नेतेषु योज्यस्त सुवहस्तः ॥

Caraka Samhitä, VIII. iii.

Also quoted in Cakradatta, Anuvasanādhikāra.

े तत सांवत्सरिकाष्ट्रदिरष्ट वर्षांणां षड्ष्ट्दशाहुल प्रमाणानि कनिष्ठिकानामिका मध्यमा-हुलि परिणाहान्यरेऽध्यदांहुलाहे वतीयाहुल सहिविष्ट कर्णिकानि कहुन्छेन वर्ष्टिपच नाही-तृत्व प्रवेशानि सुद्रमायकलायमात स्रोतांसि विदध्याचे चाणि तेषु लाख्यापनाद्रव्य प्रमाणमातुर इससम्बद्धिन प्रस्तेन सम्बती प्रसती दीचलारोऽष्टी विधेया:।

भवति चाच ।

वर्षीत्तरेषु नेताणां विस्तानस्य चैव हि । वयोवलगरीराणि समीचा वर्डयदिधि ॥

पश्चविंशतिरुखें बादशाहुनं सूनी हुन्दौदर परिणाइसये किनिष्ठिकीदर परिणाइसये बाहुन्त-सिविदि किथाकं राधपवनाडीतुन्य प्रवेशं कीलास्थिमावं चिद्रं किवकलायमावं चिद्रसिद्धेकं। सर्व्वानिसून्ते विज्ञितवस्थनार्थं विकर्णिकाित । आस्थापन द्रव्य प्रमाणं तु विद्धिता बादश प्रस्ताः। सप्तत्रेमुखें नेत प्रमाणमीतदेवद्व्य प्रमाणन् विरष्ठवर्णवत्।

तत नेवाणि सुवण रजततास्थीरौति दन्तमङ्गमणितस्सारम्यानि छचानि हदानि गौपुच्छाकतीरमज्ञानि गृटिका सुखानि । वस्तयायाङ्कानां सदवी नाति वहला हदाः प्रमाणवनो गोमहिषवराहाजीरसाणां ।

III. Vāgbhata II.

Age. (years).	Length of tube.	Opening at base admits.	Opening at end admits.
Under 1 1 to 6 7 to 11 12 to 15 16 to 20 over 20	5 anguli 6 " 8 " 9 " 12 " varies according the orifice at t	1 finger 1½ " 2 " 2½ " 3 " to the age, strengthe base of the tube	A moong (phaseolas moong). A masha (phaseolous Rox). A kalāya (pea) (pinus sativum). Boiled pea. A śṛgalakoli (zizyphis cenoplia). th and size of the patient; but a need not be wider.

नेतलाभे हितनाड़ी नलवंशास्त्रि सक्षवा।
वस्तालाभे हितं चर्चः मुचः वा तान्तवं घनम् ॥
वस्तिं निष्पदिग्धन् ग्रवः सुपरिमाजितः।
सवनुवत हीत्व सुद्दः इविमर्दितः।
नेतस्ति प्रतिष्ठाण्य नुजन्तु विज्ञताननम् ॥
Susruta Saithii

Suśruta Sanhlitä, IV. xxxv.

1 तयीम्त नेतं ईमादि धातु दार्वेऽस्य वेनुजं। गोपकाकारमक्टिद्र' स्वाजं गुड़िका सुख'॥ कनेऽच्हे पञ्जपुर्गेऽस्मित्रासमधीऽज्ञानि वट्। मप्तमे सप्त तानाणी हादणे पोडणे नव। राद्यीव परं विभाद बीचा वर्णानरिष् च। वयो वल भरीराणि प्रमाणमभिवतयेत्॥ साइ टेन समस्ति स्वील्येनारे कनिष्ठया। पुर्वे उन्दे अन्त मादाय तदबांबे प्रवितं। चाइ सं परमं किंद्रं मुलेरिये वहते तु यत्। मुद्र' मापं कलायन्तु स्तिव्र' कर्कस्पकं क्रमात्॥ मल किट प्रमागेन प्राने घटित क्या कं। वलांग पिहित' सली यचास्त' हाइ लालार'। क्षिका दित्रयं नेते कुष्यांत तव च योजयेत्॥ चनावि महिषादीनां विन मसदितं हदं। कथाय रक्तं निकिट यशि गर्भ गिरं तन्। यधितं साधनवेश सम्बं संस्थाप्य भेषत्रं। बसाउभावेऽकपाटं वा नासेबासोऽयवा धनं॥ Aştanga Hrdaya Samhita, I. xix. Cakradatta¹, Śārṅgadhara and Bhāva Miśra² follow Caraka as regards measurement. Kharaṇāda³ also gives a similar description.

- See foot note 2, Page 125.
- नेवं कार्ये मुवगांदिधातुभिवचवेगभि: । नलेहेनीविधासायैभीशाभिक्ता विधीयते ॥ एकवर्षात्त पड्वयं यावन्यानं पडड लम । तती बादशकं यावन्यानं स्वादष्टसंभितस ॥ ततः परं वादमभिरङ्गभैनेवदीर्घता । मुदाबिद्रं कलायाभं किद्रं कोलास्थिमविभम्॥ गोपुच्च सविभं सुले स्वूलं तस्मात् कमात् क्रमं। ययासंख्यं भवेत्रेतं याचा गोपुच्छ सतिभस् ॥ भातुराङ्ग हमानेन मुले स्वलं विधीयते। कनीरिकापरीगाइसये च गृटिका सुखे।। तम्मूले कर्षिके रे च कार्ये भागावनुष्कात । योजयेत् तव विश्व वस्वयविधानतः॥ सगाजग्करगवां महिषस्यापि वा भवेत । भवकोशसा बिलसा तदलाम च चर्यसः॥ कषायरकः सुखटवितः खिन्धो हदोहितः। वणवसीम् नेतं स्रात् बचामष्टाङ्जीन्मतम् ॥ महन्द्रिद्रयक्षपचनलिकापरिणाहि च।

Šārhgadhara Samgraha, III. v. Bhāva Prakāša, I. ii.

विस्तिनेतसल् ग्रक्तं मह्त्तह् लिकास्ख्यम् । भवेद्वोपुच्छसंस्थानं सुप्रवाहं विकणिकम् । या विभागपण्यने नयाँदा कणिका भवेत् । हे कणिके चोपरिष्टाहस्त्राधारेऽप्रवासरे । साह्रष्टकपरीणाहं सूलं नेतस्य गस्यते । स्त्रे त्वनामिकातुल्यस्यं तुल्यक्तिविकं । स्त्रे नाह्यले प्रमाणन देधे स्याद् हादमाङ्गलम् : कार्कम्यप्रवहच्चिद्रं श्रेष्ठसम्बद्यवावयः । Hārīta¹ advises us to use a bamboo tube four anguli long, which is to be introduced into the rectum up to two anguli.

As a general rule, Caraka writes that the broad and the narrow ends of the tube are to be equal to the patient's thumb and little finger respectively, in circumference. The orifice at the end of the tube is to be kept closed by a wick, so that no foreign body may enter the lumen of the tube to occlude it. The plug may be easily removed when the tube is required for use, and then replaced.

Towards the narrow end of the tube is a projection or ring at a distance of about two anguli from the extremity. The height of the projection varies with the size of the tube at the base. It acts as a bar to the further introduction of the tube inside the rectum than required. Towards the base are two similar projections, two anguli apart from each other. To the one near the base is firmly tied the leather bag, so that the tube may not slip away suddenly during forcible compression of the bag. The other is meant to afford a firm grasp by the surgeon, so that the tube may not move during its introduction into the rectum. These projections are to be made of thread or a piece of cloth and are to be so shaped as to resemble the end of the proboscis of an elephant.

As regards the leather bags, they are recommended to be

विभवादम्यव्ययं वादमास्यव्यक्षः हुं उलम् । कर्कम्युक सतीनायमुखं विद्ववृत्तम् ॥

Kharaṇāda quoted in Sarvānga Sundarī, I. xix.

े चतुरङ्गुलां देशमधों माङ्गे प्रतिस्वचर्ण करना लया विस्मातिकक्षे कुर्यात्। * * ग्रहाधनरे द्वाङ्गनातं नाङ्गे सवारयेत् सुधीः।

made of the bladder of cows, or buffaloes, or hogs, or goats, or lambs. The bladder is to be well cleaned first with lime and water, so that no unpleasant smell may be emitted by the decomposition of its muscular tissue, then dyed red with Mañjiṣṭhā (Rubia Cordifoliatum) or with Harītakī (Terminalia Chebula, Retz.) and thoroughly dried. The bags are recommended to be soft, durable, entire and capacious. If the bladders of these animals are not available, the bags are to be manufactured from a frog's skin, or the peritoneum (one-fourth part would suffice) of any beast, or a piece of leather or a piece of very thick cloth. The size of the bag varies according to the age of the patient. It is to be firmly tied over the first projection at the base of the tube.

In the Siddhisthana Chapter XI of the Caraka Sainhita, there is a passage showing that veterniary medicine was well-known to the ancient Hindus at a very early period. This portion was edited by Drdhavala and it is impossible to decide whether the passage refers to Agnivesatantra or not. It runs as follows:—
"Then the disciples asked: 'How are clysters to be made in cases of animals such as elephants, camels, cows, horses, lambs and goats?' To this, the sage Ātreya explained the clysters for

Caraka Samhitā, VIII. xi.

अप्रक्टरेनं सचवित्तमत्रवीत् विधिक्षतस्याह पुनः प्रचीदितः । अजाविकसीन्य गजोष्ट्योवां गवाययोवेत्तिसुशान्तिमाहिषम् ॥ अजाविकादनासुवित्तसुत्तरं वदन्ति वत्तिः विपरीतरूपम् । सुवित्तमटादश्योदशाङ्गलं तयैवनेवच दशाङ्गलं क्रमात् ॥ गजोष्ट्रगोऽयाव्यजवित्त सन्धौ चतुर्यभागे च सक्षिकः वदित् । प्रस्यस्वजाव्योद्धिं निरुष्टमावा गवादिव् विवित्रयो यथा वलम् । निरुष्ट उद्दश्य तथादकदयं गजस्य इविन्तनुवासनेऽष्टमः ॥

animals in the following manner. The leather bag of the vastiyantra should be made of a buffalo's bladder for goats, lambs, elephants, cows, camels and horses. The vasti for these animals is known as suvasti and uttara-vasti as uttara-suvasti. The tube of the suvasti should be eighteen anguli long for elephants and camels, sixteen anguli for cows and horses, and ten anguli for goats and lambs. Like the vasti yantra used for men, it should have a projection at the junction (of the tube with the bladder) and another at the fourth division of the tube from the end."

In the Aśvavaidyaka¹ the tube for the horse is thus described:
"The tube should be made either of wood, or metals, or horn, or
bamboo, or reeds. Its length should be twelve anguli and
circumference six anguli. The wise surgeon should make the tube
of such a calibre as to allow a plum seed to pass through it easily.
It should be straight, polished and tapering from the base. At
a distance of four anguli from the end of the tube, a projection
should be raised, while for tying the leather bag firmly to the
tube, two projections ought to be constructed at the base".

Pālakāpya² describes the rectal clysters for elephants. He advises that these are to be made either of wood or bamboo. The end is bulbous and the surface smooth. The length

कार्टर्स्डरयोभिय श्रह्मवंशनलादिभिः। बादगाङ्गलदीर्धन् परिचारे षडङ्गलम् ॥ कोलास्थिमाविक्तद्रन्तु कुर्याद्रेतं विचचकः। मृलादनुकम श्रव्कासस्यान् विशेषतः॥ त्यकाङ्गलानि चलारि कर्षिकानस्य कारयेत्। पुटकस्यप्रवस्थाय मृले हे चापि कर्षिके॥

Aśvavaidyaka, XVI. vs. 2-4.

^{*} Pālakāpya's Hasti-Āynrveda, Sec. IV. Ch. V.

length of the tube varies, the most convenient being sixteen anguli for men and sixty-eight anguli for elephants. The projections at the base of the tube should be twelve anguli high. He describes in detail the method of introduction, position of the elephant, etc.

Drdhavala advises us to reject the following eight kinds of tubes and eight kinds of bags¹:—

I. Tubes-

- Hrasva or too short: For the injection does not reach the proper place.
- Dirgha or too long: For the injection passes beyond the proper place.
- Tanu or too thin: The injection can not pass through the tube easily and so the bag may burst.
- Sthula or too thick: The tube pulls the mucous membrane of the rectum and anus backwards and forwards during its entrance and exit.
- Jirna or old, weak and delicate: The tube may break inside the rectum during its introduction and so cause injury to the gut or anus.

जस्तं दीचे तन्स्युलं जीवे शिविलवन्त्रनम्। पातं चिद्धदं तथा वक्तमटी नेवाचि वर्जयेत्॥ अप्राप्तातिगतिचोभकवेषचयनस्वाः। गृदपीका गतिजिक्का तथा दीषा यथाक्रमम्॥ मासलच्छिदविषमस्यूलजालकवातलाः। किन्नः क्रियय तानटी वस्तीन् कस्त्रेम् वर्ज्ञयेत्॥ गतिवषम्यविस्रतस्वसायदीयाद्यतिस्वाः। फिनिलच्यत्रप्राय्येलं वसीः स्वाद वस्तिदीयतः॥

- Sithilabandhana: The tubes do not fit the bags well, so during compression of the bags, the injected fluid runs out by the side of the tube.
- Pärsvacchidra or leaky: Having slit on the side, the tube may injure the soft parts by rubbing against them.
- Bakra or curved: The motion of the injected fluid would be curvilinear. It will strike a side of the rectum and so would not go inside the gut.

H. Bags-

- 1. Mamsala or fleshy: The bag emits bad smell.
- 2. Chidra or leaky: The injection escapes outside.
- Viṣama or uneven: Parts are unequally compressed and so the injection does not issue in a forcible jet.
- Sthula or thick: It is difficult to grasp the bag and so it can not be foreribly compressed.
- 5. Jālaka or having a network: The injection comes out.
- Vātala or hollow, airy and incompressible: If air can not be expelled out, froth forms in the injection; and so air is pumped into the rectum.
- 7. Chinna or torn: The injection flows down.
- 8. Klinna or moist: The injection can not be forced out.

Susruta mentions eleven defects of tubes and five defects of bags of the Vasti yantra.

Suŝruta Samhita, IV. xxxv.

सजुनेतं विषयं स्वात्तव सम्यन्तिज्ञानता। श्रतिस्युनि कर्केंग्रे च नेते चावनते तथा॥

मित्रमुलं कर्कशमवनतमग्रिमद्रं सित्रक्षटं विप्रक्रेष्टं क्यिकं मुद्मातिष्किद्रमितिदीर्ध-मितिष्रसितिकेकादश निवदीयाः। वहलतात्यता सिक्डिद्रता प्रसीमंता दुर्व्विहतित प्रवित्तः दीयाः।

I. Tubes-

- 1. Atisthūla: Too thick.) Such tubes injure the rec-
- 2. Karkaśa: Rough.

 † tum and so cause pain.
- 3. Avanata: Curved.
- 4. Anu: Too thin.
 5. Bhinna: Broken. It becomes useless to inject
- 6. Sannikr ta Karnika: Projection near? fluids into the rectum.
- Viprakṛṣṭa Karṇika: Projection disfant?

 Jinjure the rectum which bleeds.
- 8. Sūksma: Small orifice.) It becomes difficult to inject
- 9. Atihrasva: Too short. I as the fluid comes out.
- 10. Atichidra: Large orifice. Too much fluid passes into the rectum and so pain is
- 11. Atidirgha: Too long.) complained of.

II. Bags-

- 1. Vahalatā: Fleshy. \ It is difficult to tie the bags
- Prastīrņatā: Large. J over the tubes properly.
- 3. Saechidrată: Perforated. \(\) No fluid can be forced into the rectum and so
- 4. Durvviddhatā: Difficult to the instrument is useless.
- Alpatā: Small. Small quantity of fluid passes into the rectum.

गुर्दे भवेत् चतं रुक् च साधनं पूर्ववत् खृतं।

प्रामन्न कर्षिक नेवे भिन्नेऽषी वाष्यपार्वं कः ॥

प्रवसेको भवेदलेसस्मादोषान्त्रिवर्ज्यंत्।

प्रकट कर्षिकं रुक्तं गुरमस्य प्रपीडनात्॥

प्रस्थातापि पित्तप्रो विधिवंसिय पिष्क्तिः।

प्रस्थितस्मीतिस च क्रे गो वस्मिय पूर्ववत्॥

प्रत्यागच्छंसतः कृष्यादोगात्मस्य विधातजान्।

दीर्घे महास्रोतिस च ग्रेयमत्यवपीडवत्॥

प्रसीर्वे वहले चापि वस्ती दुक्वंद्व दोषवत्।

वस्तावन्येऽस्पता वापि द्रव्यस्थास्पग्ना मताः॥

दुक्वंद्वे चास्तु भिन्ने च विश्लेष्टः भिन्न नेववत्।

16. UTTARA-VASTI.

Urethral, Vaginal and Uterine Tubes.

Injections into the urethra and vagina are also recommended to be thrown in by similar contrivances: the tubes being adopted in length and circumference to the length and breadth of the passages for which they are intended.

1. Tubular Instruments for the Urethra.

The tubes intended for applying medicines into the male urethra is recommended to be twelve anguli long. Susruta advises us to use tubes fourteen anguli long. It is to be made of gold and is called Puspanetra. Its circumference is equal to that of a stalk of flower of Jäti (Jasmimum Grandiflorum) or Mālatī (Echites Crayophyllata, Rox.), and the lumen of the tube allows a mustard seed to pass through it. It is provided with an annular projection just at the central part. Caraka² says that

Suśruta Samhitā, IV. xxxvii.

विशेषकरसञ्चलिथि वद्यास्यतः परं॥ चतुर्द्वशाङ्गलं नेतमातुराङ्गलं सम्यतम्। मालतीपुण्यञ्चारं किटं सर्पप निर्ममम्॥ मेद्रायामसमं केचिदिच्छित्ति खलु तहिदः। स्रेष्ठ प्रमाणं परमं कुचयात प्रकीतितः॥ पचित्रं प्रायास्योमातां विदध्याद वृतिकल्पिताम्। निविद्यकर्षिकं मध्ये नारीणां चतुरङ्गले॥ सृतस्रोतः परीचाधं सुद्ध वा हि दशाङ्गलं। तासामपत्यमार्गे तु निदध्याद्यतुरङ्गलम्॥ दाङ्गलं सृतमार्गेत् कन्यानाम्त्येकमङ्गलम्। विशेषं चाङ्गलं तासां विधिवद्यातं यथा॥

पुष्पनितञ्ज हैमं स्वात् मृद्यामी तरवित्वसम् ।

it has two projections while Vāgbhaṭa¹ describes three. The bag is to be made of goat's bladder. A probe is first passed into the urethra to examine its condition and then the tube is introduced up to the length of six aṅguli. The bladder which contains the injection and which is tied tightly round the tube, is then compressed to force the fluid into the urethra. The tube of course, varies in size according to the dimensions of the organs of generation.

For the female, the puspanetra is described to have the length of ten anguli. The projection is at a distance of four anguli from the base. The circumference of the tube varies according to the width of the urethral canal. The calibre of the tube allows a moong to pass through it.²

जातीपुष्पस्य इन्तेन समें भीपुष्पसंस्थितम् । रीप्यं वा सर्वपक्टिद्रं डिकर्णं बादशाङ्गलम् ॥ ४८ ॥ Caraka Samhitti, VIII. ix.

ध्यातराङ्गलमानेन तन्ने तं बादशाङ्गलं (हमं गीपुच्छवत् मूल मध्ययी: कत कविकः । सिवार्यक प्रवेशायं त्रचां हेमादि संख्यं। कुन्दायमार समनः पुष्टक्लोपमं हदं। तस्य बिलसं दुलचुमांता ग्रांकिविकच्या वा॥ भ नेतं दशाङ्गलं मुद्रप्रवेशचतुरङ्गलं। चप्रत्यमार्गे योज्यं स्वाह्यङ्गलं मृतवत्सीनि॥ मृतकच्छविकारेष् वालाना सोकमङ्गलमः।

Aşţānga Hrdaya Samhitā, I. xix.

प्रथमित प्रमाणन् प्रमदानां दशाङ्गलम् । मृतस्रोतः परीणार्धं मृतस्रोतोऽनुवाहि च ॥ गर्भमागृ तु नारीणां विषयं चतुरङ्गलम् । षाङ्गलं मृतमागृ तु वालाया स्त्रो कमङ्गलम् ॥

Caraka Samhita, VIII, ix

Catheters.

It is curious to find no description of so important an instrument as the catheter. Injections were thrown into the urethra but the tube used was always a straight one, having the length of six anguli; so it could not possibly have reached the bladder in the male, and nowhere has the claim been put forward for it to have done so. The tube might have served well for the females. The female catheter of the Greeks, as preserved in the Naples museum, is 0.98 mm. long and is straight throughout (Milne).

In the Atharvaveda Samhita, however, we find a hymn, unmistakably alluding to the use of catheter in ancient times.

Against obstruction of urine with a rod.

"This hymn is intended to be used in a rite for regulating the flow of urine'. The reed implies some primitive form of a fistual urinaria, the vastiyantra (one of the nadiyantrani) of the late physicians—who however do not appear to have made frequent uses of it".

* * * * * *

- 6. What in thine entrails, thy (two) groins, what in thy bladder has flowed together—so be thy urine released, out of thee with a splash! all of it. (In the groin are two vessels located in the two sides affording access to the receptacle of urine).
- I split up thy urinator, like the weir of a tank—so be thy urine released, out of thee, with a splash! all of it.
 - 8. Unfastened (be) thy bladder orific, like that of a water-

Book 1. 3. Whitney's translations and annotations.

holding sea—so be thy urine released, out of thee, with a splash!
all of it.

 As the arrow flew forth, let loose from the bow,—so be thy urine released, out of thee with a splash! all of it".

2. Tubular Instruments for the Vagina.

Similarly injections were thrown into the vagina. The vaginal tube should be thicker than the urethral tube and in circumference should be equal to that of the little finger. It should be introduced into the vaginal canal up to a distance of four anguli, whereas into the urethra, the tube was allowed to enter up to a distance of two anguli only in the adults and of one anguli only in the girls.

3. The Uterine Tubes.

The uttara-vasti comprises the urethral syringe—male and female—and the vaginal and uterine clysters. No distinct uterine tube is described in the text books. But Suśruta² says

> वादशाङ्गलकं नेतं मध्ये च कतकणिकम्। मालतिपुप्यक्ताभिक्ट्रं सप्यनिगमम्॥ स्वीणां कनिष्टिकास्य लं नेतं कुर्यादशाङ्गलम्। मुद्रप्रवेश्वं योज्यस्य योन्यनप्यतुरङ्गलम्॥ बाङ्गलं स्वमागं च एकं नेतं नियोजयेत्। स्वक्रश्वविकारपु वालानामिकमङ्गलम्॥

> > Šārngadhara Samhitā, III. vii. Bhāva Prakāša, I. ii.

उर्वुजाले स्विधे द्यादुनानाथै विचचन:। कलातरस्य कस्यायै द्यात् सुसदु पौड़ितं। विक्रिकेन नेतेन द्यायोनिसुस्तं प्रति। गर्भागय विग्रुवार्थं सेहन हिगुणेन तु। सम्बागच्हति भिषक वसावनरसंजिते। that to apply uttara-vasti to a female, she is advised to lie supine, keeping her knees flexed and well raised. For a girl the quantity of injection is one prasrta.

To purify the uterine cavity, apply a clyster of twice the quantity of oleaginous medicines, inside the vagina by means of a tube having three rings. If after the application, the oily medicine does not flow out, then apply a second clyster containing medicines of the group called sodhana or purifiers, into the rectum; or let the elever surgeon introduce a probe into the space of the clyster; or press under her navel deeply by his closed fist. As the object of the injection is to clean the cavity of the uterus, there can be no doubt that a uterine tube is referred to in the passage. Again the precautions recommended if the injections do not come back easily, point to a uterine tube to have been used, for injections into the vagina can not be delayed in coming out. The Hindu writers often confounded the intrauterine and urethral injections with the vaginal elyster. Caraka1 says: "The uttra-vasti is to be used for the females during the period of menstruction, for then the uterus, being in a condition fit for impregnation, has its mouth open and so can easily be reached by the injection." This shows that uterine medication to be the object aimed at by the clyster.

भ्यो विन विद्यात संयुक्तं शौधनैभैकै:।
गुदे विन निद्याश शोधनद्रव्य संस्तां।
प्रवेशाश मितमान्वसिदारमयैषकीम्।
पौक्येशायधोनभिवेतनोक्तरमुटिना।

Suśruta Samhitā, IV. xxxvii

म्बीयाचार्भवकाली तु प्रतिकर्य तदाचरेत्। गभांसना सुखं खेइं तदादने छपाइता॥ गभं योनिसदा शीध्रं जिते स्ट्रांति माकृते॥

Caraka Samhita, VIII. ix.

The Greeks were no better, for Milne also complains:

"It is dificult to separate ancient descriptions of injections into
the vagina from those into the uterus, for the terms for the
two parts are frequently interchangeable". Again he says:

"It is probable that at other times under the heading of 'injections of the bladder', only irrigation of the urethra is meant".

18. TUBULAR INSTRUMENTS FOR INHALATIONS AND FUMIGATIONS.

The tubes for smoking were made, like the vasti tubes, of various metals, or glass or wood. Caraka² describes it as a straight tube having three pouches. The end of the tube is equal in diameter to that of a plum seed. Śārṅgadhara³ adds that a reed or bamboo pipe will also serve the purpose. It is described as a straight tube, the broad base of which admits the patient's thumb while the narrow end, a plum seed. Suśruta⁴ describes the base

चतुम्बिंगतिकं नेतं सङ्गुलीभिविरेच्ने । हातिंगदङ्गुलं सेहे प्रयोगे चार्डमिष्यते ॥ चलुतिकोषफलितं कोलाख्यगप्रमाणितम् । विसनिच समद्रस्यं धुमनेचं प्रगस्तते ॥१६

Caraka Samhitā, I. v.

अध्मनाकी भवत्तव विख्यका च विपविका ॥१० कनौत्रिका परीणाहा राजमाधागमान्तरा । धूमनाकी भवेदीयां श्रमने रोगिणीऽङ्कै: ॥११ चलारिशिक्ततेस्वद्द्वार्विश्रक्ति दी खुता। तीलां चतुर्विश्रतिभि: कामन्ने थोङ्शोक्तिते: ॥१२ दशाङ्गुलियांमनीय तथासाद्वश्रणनाहिका। कलायमग्रालाख्का जुलळागमरस्का ॥ १३

Śārngadhara Samhitā, III. ix.

Graeco-Roman Surgical Instruments, P. 107-8.

[ै] तत विभागेतद्रव्येधुंभनेचद्रव्याणि व्यासातानि भविन । धूमनेतस्त कनिष्ठिका परिचाइमये कलायमातं सोतोम्ले इड्डपरिचाइं धूमविन प्रवेश सोतोऽङ्गास्ट चलारिशर् प्रायोगिक । धार्तिशत् सेइने । चतुर्व्विशेतिक रेचने । धोडशाङ्गलं कामधे वामनीय सः।

and end of the tube to be equal in circumference to that of the thumb and little finger respectively. The orifice should allow a common pea to pass easily through the tube. Vagbhata1 says that there are three pouches or dilatations of the tube, shaped like the half-open buds at equal distances from each other. The tube is supposed to consist of four equal parts. The first pouch is located at the end of the first part, the second and third pouches at the ends of the second and third parts respectively. Cakradatta² also describes it similarly.

Drdhabala3 mentions another method of inhalation. He makes a paste of the medicines prescribed and smears it on a piece of silk cloth. This is then to be rolled round like a wick. This wick is to be dipped in ghee before use, and fire lit at one end, while the patient is to smoke it through the other end.

एने चपि कोलास्थिमात चिद्धे भवत:। त्रचनितमटाङ्गलं त्रचधपनार्थं कलायपरिमन्डकं कलखबाहि स्रोत इति ।

Suśruta Sańbitä, IV, xl.

- े बस्ति नेच सस देखें विकीयं कारयेतज । मुला, रेंड्र ए कोलास्त्रि प्रवेश धमनेतक। तीचा संसन मध्येष तींगि चत्वारि पञ च। चङ्गलीनां कमात् पातुः प्रमागे नाष्टकानि तत् ॥६॥ Astánga Hrdaya Samhitā, I. xxi.
- विस्तितसमद्वां धमनेवं प्रशसाते। मार्बस्वंत्रायतः पुनाहिस प्रायोगिकादिष् । नेते कासहरे वंश्रहीन: शेषे दशाहल: ॥

Cakradatta, Dhumapanadhikara.

े प्रपन्दरीकं मधकं शाह हा समन:शिलाम । सरिचं पिपालीं दाचामेलां सरसमध्रीम् ॥ कला विन पिवेजुमें चीमचेलानुविन ताम 1 ध्ताकामन् च चौरं ग्डीदकमदापिवा ॥

काजिकीयफलितं कोलास्ययप्रमाणितमः।

Caraka Samhitā, V1. xxii,

Both Caraka¹ and Śārūgadhara² advise us to make tubes of medicines, the fumes of which are advised to be smoked in the following manner:—Powder the medicaments and make a paste; measure one karsa; take a smooth reed (Saccharum sara, Rox.) twelve aŭguli long. Apply the paste round the reed, for a length of eight aŭguli. Dry it in shade. Remove the reed, leaving a dried tube of the paste. When required for smoking, light one end of the tube with a burning wick and smoke through the other end.

Caraka³ describes another inhaler, which consists of two carthen basins (soraba) placed upon each other, their edges being pasted with flour. The upper one is perforated at the centre for the reception of one end of the tube, the patient puts the other

े पिट्टा लिग्गेक्टरेपीका ता विने यवसित्रमा ।

भाग त्रसम्बद्धाः कथादिटा शुलसमा भिषक् ॥

सक्षा निगमा ता वित्ते धूमनेवार्षितां नरः ।

सेदाकमित्रसंदुष्टां पिवेत् प्रायोगिकाँ सस्वाम् ॥ € ॥

Caraka Satahitä, I. v.

अधिकां प्रचिपेच सुद्रक्तां दादगाङ्गलाम्। धूमद्रव्यस्य कत्कं न लेपयाहाङ्गलः स्मृतः ॥ कत्कः कर्णमतं लिया द्याया ग्रक्तच कारयेत्। द्रिपकामपनीयाय संहातां विश्वमादरात्॥ भङ्गारदीपितां कत्वा प्रता नेतस्य रस्पृकः। वदनेन पिवेद्युमः वदनेनैव संव्यजित्॥ नासिकास्या ततः पीता सुक्षीनैव वसेत् सुधीः।

Śārngadhara Sangraha, III. ix.

मध्किष्टं सर्जरसं एरं सज्जकसंप्रे । कला धूमं पिवेक्ट्रां वालं वा सायु वा गवाम् ॥ श्रीणाकवर्षमानामां नाहीं गुष्कां कुशस्त्र वा।

Caraka Samhitä, VI. xxi.

end into his mouth for inhalation. The lower pot contains glowing charcoal of catechu (Accacia catechu, Linn.) wood, over which are put pills of necessary medicines. The tube is from eight to ten anguli long.\(^1\) This inhaler is intended for phthisical subjects. It is useful for allaying cough and exciting emesis. This instrument is called mallaka samputa or sor\(\tilde{a}\)based samputa or a pair of earthen basins. In such an apparatus Caraka recommends us to put powders of cow's horn, hairs, nerves and ligaments, besides other medicines. Susruta\(^2\), V\(\tilde{a}\)ghhata\(^3\) and Cakradatta\(^4\) also describe it. S\(\tilde{a}\)r\(\tilde{a}\)gadhara\(^5\) however reserves this instrument for fumigating wounds only.

The length of the pipe will vary according to the different kinds of smoking prescribed by the physician. There are five kinds of smoking narrated:—

- 1. Śamana, madhya, proyogika medium.
- 2. Brimbana, snehana, mrdu mild.
 - रशाङ्गलोत्मितां नाडाँ अधवाष्टाङ्गलोत्मिताम् । शरावसंपुटच्चिद्रे कला जिल्लां विचल्लाः ॥ वैरेचनं सुखेनेव कासवान् धुममापिवेत् ।

Caraka Samhita, VI. xxii.

इतरवीर्थिपेत घूमोङ्गर स्थिरे समाहिते शरावे प्रथिष्य वित्त मुलक्तिद्रेणान्येन शरावेण पिथाय तक्षिन्व्हिदे नेवमुलं संयोज्य धुममासेवेत ।

Suśruta Samhitä, IV. xl.

अराव सन्पुटच्चिद्रे नाडी नास्य दशाहुआं। अष्टाङ्ग्लां वा वर्त्वोच जासवान् धुममापिवेत्॥

Astānga Hēdaya Samhitā I. xxi.

भयवा सञ्चतान् शक्तृन् क्रत्वा सिक्कासम्पृटि ।
 नवप्रतिग्यायवतां भूमं वैद्यः प्रयोजयेत् ॥

Cakradatta, Nāsāroga Cikitsā,

See foot-note 2, P. 145.

- 3. Recana, śodhana, tīkṣna - strong.
- 4. Kāsaghna anti-cough.
- 5. Vāmana emetic.

So the length of the tube would vary thus-

1. Caraka¹

0.22				Anguli.
	In strong smoking	***	***	24
	" medium "	***	1000	32
	" mild "	***	988	96
2.	Suśruta. ⁹			
	In medium smoking	***	255	48
	" oleaginous "	10.0	202	32
	" brain-sedative "	***	***	24
	" anti-cough or emetic	"	985	16
3.	Vāgbhaṭa. ³			
	In strong smoking	***	***	24
	" medium "	***	222	32
	" mild "	***	555	40
4.	Śārngadhara.4			
	In medium smoking	***	11.5	40
	" mild "		***	32
	" strong "		24.4	24
	., anti-cough "	***	444	16
	" emetic or			
	wound-fumigation	***	***	10

FUMIGATION.

Similarly wounds are said to be purified by suitable medieinal fumigation. In the purification of wounds by fumigation, we get a glimpse of the antiseptic method of treatment in its

¹ See foot-note 2- P. 140.

³ See foot-note 1, P. 141.

See foot-note 4. P. 140.

^{*} See foot-note 3, P. 140

embroyonic form. Suŝruta¹ recommeds the tube to be eight aŭguli long and to have the circumference of a common pea; and its orific should be of the size of a kulattha (Dolichos biflorus, Linn.). The fumes of medicated substances from the inside of any closed pot containing fire, pass out through the tube and are allowed to play on any sore to purify it. For this purpose two earthen pots—sorāba sampuṭa—may conveniently be used as before. Śārṅgadhara² uses a tube ten anguli long and recommends us to use Nimba leaves (Azadirachta Indica) for wound-fumigation. As another instance of the application of the principles of antiseptic methods to practical therapeutics, we may mention the use of medicinal injections into the cavity of the uterus to rectify its morbid conditions.³

A similar instrument was used to fumigate the uterus and vagina in various diseases of these parts. "Fumigation", says Sušruta, "is to be applied to the vagina by burning the

त्रसनितमदाङ्ग्सं त्रयधूपनार्थमकसायपरिमखसं कुलत्यवाहिसोतदति ।

Suśruta Samhitä, IV. xl.

स चौमयवसर्पिभिर्धुपनाक्षेत्रध्पयेत्।

Ibid. IV. i.

दशाङ्गलिवांमनीय तयास्ताद ज्ञणनाड्का। कलाय मण्डलस्कूला कुलत्यागमरभुका॥१२

शरावसम्पुटे चिम्रा कत्व्वमङ्गारदीपितम् ॥१० क्ट्रे नेव' निवेश्वाय त्रणनीनेव भूपयेत् ।

वर्षे निम्बवचाराँच धूपनं संप्रशस्ति।

Särngadhara Samgraha, III. ix.

² See foot note 2, P. 1318,

सभैसङ्घे तु योगिं भूपयित् क्रणसपैनिक्योंकैण पिन्छीतकेनवा ।

slough of a snake (Bungarus) or pinditaka (?) wood, in cases of obstructed delivery of the fætus. Caraka1 mentions fumigation of the vagina by burning Bhurjapatra (Betula Bhojpatra), glass, precious stones and the slough of a snake as one of the means for removing the placenta. To remove the after pains and difficulty in mieturition and defrecation, Suśruta² advises us to fumigate the vagina. He recommends fumigation of the uterns with purifying medicines. In fumigating these parts, the Hindu surgeons desired a local action, and did not share in the belief, held by some of the Greek gynaecologists that "the uterus was an animal within the body which could wander about, being attracted by pleasant smells and repelled by disagreeable smells".4 The Arabs also did not believe uterus to be an animal." This method of treatment was well known to the Greeks; for Hippocrates writes that "fumigation with aromatics promotes menstruation and would be useful in many other cases, if it did not occasion heaviness of the head". He "directs us to take a vessel which holds about four gallons and fit a lid to it so that no vapour can escape from it. Pierce a hole in the lid, and into this aperture force a reed about a cubit in length so that the vapour connot escape along the outside of

Caraka Samhita, IV. viii.

Suśruta Samhitā, III. x.

मृज्यंपवकाचमिक सर्पनिकाँकैयास्या योगि धप्यत्।

कटुकालावुकतवेधन सर्थंप सपॅनिकॉकिंका कटुतैलविभिग्रैयोनिसुखं ध्रयति।

Aretæns, Morb, Acut. ii. 11. Plato's Timeas.

Gracco-Roman Surgical Instruments, P. 158.
 Adan's Commentary on Paulus Ægineta, Vol. I. Bk. ii. P. 636-37.

See also in the Hippocratic treatises, as Nat. Mul. vii, 9; 1 Morb. Mul. viii, 1; II Morb. Mul. xl. 20, 2I; Steril. vi. 3; Superfect. ix. 3, x. 9, II.

the reed. The cover is then fixed on the vessel with clay."

Oribasius² and Soranus³ used similar instruments for the purpose.

DISINFECTION OF ROOMS, CLOTHES, etc.

Caraka says that if peacock's feather, bones of vaka bird, white mustard and red sandal wood, well powdered and mixed with ghee, be used in fumigation, the poison of a room, beddings, seats and clothes, is got rid of. Śārṅgadhara advises us to disinfect a sick room by the fumes caused by burning the following substances with ghee: peacock's feather, Nim leaves (Melia Azadirachta), Vrihati, pepper, asafœtida, Jotāmāmsi (Nardostachys jotamansi), seeds of Sālmalī (Bombax malabaricum), goat's hair, slough of a serpent, cat's fæces and ivory. Suśruta advises fumigation of a sick room for a surgical patient for

Caraka Samhita, VI. xxv.

मयूरिपच्छं निम्नसा पतािष बहतीफलम्। मित्वं हिंहु मांसी च बीजं कार्पाससम्बम्।। इतिरोमाहिनिक्षोंकं विष्ठा वैकालिकी तथा। गजदन्तय तथ्यं किखिङ्ग विमितितम्। गेष्ठेषु धूपनं दत्तं सर्वनालयहाञ्चयेत्। पिशाचान् राचासञ्जाता सर्वज्वरहरो भवेत्॥

Śārngadhara Samgraha, III. ix.

सर्वपारिष्टपताभ्यां सर्पिषा लक्ष्येन च ।
 विरन्द कारयेव्यं दशरातमतन्द्रितः ॥

Sušruta Samhitā, I. xix.

Graco-Roman Surgical Instruments P. 159.

^{*} Coll. x.xix.

Boranus, xxiii,

श्रिखिवर्धवलाकास्त्रीनि सर्पपायन्दने च एतपुक्तः ।
 धूमी स्टक्ष्यवनासनवस्त्रादिषु शस्त्रते विषतुत्॥प्रता

ten days, morning and evening, after the operation has been performed.

15. TUBULAR INSTRUMENT FOR CUPPING.

Generally cow's horn is recommended for the purpose. It is eighteen anguli long, its base, forming the mouth of the instrument, is three anguli wide (Vāgbhaṭa).¹ It is conical in shape and the cone is said to be either curved or straight. The other end is pointed and perforated to the extent of allowing a mustard seed to pass through it. The narrow end, however, is made to assume the shape of a woman's nipple by winding thread round it. This facilitates the operation of suction by the mouth of a surgeon when the broad end is placed against any diseased area of the patient's body. Suśruta² mentions its use in blood-extraction. For extracting bood, the part must be scarified before its application; and to facilitate the operation, the part should be fomented (Yogaratnākara),³ After suction, the horn is to be covered by a piece of cloth or a small bladder of animals.

Vällüki⁴ describes the śrnga thus:—"It is the horn of a white eow, half-moon shaped and seven anguli broad. The orifice

> वाह्मासं भवेच्हुहं चूपवेऽटादशाह्मं। परिसदार्थकाच्छ्रदं सुनस्वनुकाकति॥

> > Aştanga Hrdaya Samhita, I. xxv.

तवप्रच्छिते तनुबस्तपटलावनडेन ग्रङ्गेन शोचितसबस्चियेदाच्यचात्।

Suśruta Samhita, I. xiii.

स्ते दं विदध्यालुशस्य नाद्या ग्रहेन रक्तं वसुत्र: स्रेश ।

Yogaratnākara Arbuda cikitsā,

किषाणः वित्रगोरिन्द्रचतं सप्तात्नुलायतम्। चिप्तानाः पिचुपेशिकं योज्य वातयुतिऽस्ति। चत्र हे मुलक्का ले किद्रमयेऽसा सुद्रवत्।

Vallüki quoted in Nibandha Samgraha, I. ziii.

at the base is equal in circumference to that of the base of the thumb, while the end which is perforated admits a moong. This orifice at the end is closed by a wick of cotton". Cakrapānidatta says that the horn should be three auguli long, and its orifice should be of the size of the stalk of an oleander flower.

Susruta mentions a peculiar use of the horn¹: the extraction of an insect, cerumen, etc. from the middle ear by means of a horn or a probe. The horn was evidently used as an apparatus for suction, and Susruta describes suction as one of the methods of extracting salya from the body². Caraka³ uses horns and leeches to extract venom from a snake-bite; and Susruta also refers to it. Besides the horns and cupping glasses, suction used to be accomplished by the surgeon's mouth.

Similarly Paul⁴ says that foreign bodies may be sucked out from the ears with a reed.

On the method of suction as a mode of treatment, Erichsen's says:— "In former days, when duels with the small swords were of frequent occurrence, persons called "suckers" who were often the drummers of a regiment, were employed to attend the wounded combatants. This treatment which was conducted with a certain degree of mystery, consisted in sucking the wound till all blood ceased be flow, and then applying a pellet of chewed

Suśruta Samhita, VI, xxi.

Caraka Samhita, VI. xxv.

में कर्याच्छिद्रे वर्तमानं कीढं क्रीदमलादि वा। प्रक्रीणापहरिश्वीमानद्यवापि शलाक्या।

² See foot-note 3, P. 108.

[ै] दंशं वा चुधेन्सु खिन यवचू थै पांग्रपूर्वेन । प्रच्छन् वेधजलीकः सङ्गः साव्यं ततो रक्तम्॥

^{*} Paul. VI. xxiv. and III. xxiii.

^{*} Erichsen's Surgery, Vol. 1, p. 341,

paper or a piece of wet linen to the orifice; in this way it would appear that many sword thursts traversing the limbs were healed in a few days. The process of suction cleared the wound thoroughly of all blood, and drawing the sides into close apposition, placed the parts in the most favourable condition possible for union by primary adhesion. This practice might, perhaps, in many cases advantageously imitated in the present day by means of a cupping glass and syringe".

We also find Suśruta¹ describing a vasti yantra in the treatment of snake-bite. The tube is open at both ends, one end is applied to the part bitten by the snake, while to the other end the surgeon puts his mouth to suck out the poison. So this vasti yantra may be compared to the modern aspiration syringe.

Cupping instruments of metal or horn are still used by the Arabs in Kordofan and Sir R. Pasha² suggests that cupping is possibly borrowed by the west from the "most perfect physicians" the Arab. But now we are confident that the credit is due to the Hindus.

ALĀBU YANTRA.

Alābu or gourd is described to be made of the bark of the succulent fruit called alābu (Lagenarea Vulgaris). The pulp is scraped away and the bark is allowed to dry. Such a bark should be selected which is twelve and eighteen anguli in length and circumference respectively. Its mouth should be circular and should have a diameter of three or four anguli. A fire is to be lit inside it by burning a strip of dry cloth to produce a vacuum, and the

¹ प्रतिपूर्ण सुखं वसी हिंतमाच्यणं भवेत्।

Susrnta Samhita, V. v.

Fide Third Report, Wellcome research laboratory at Gordon, P. 316.

instrument to be applied instantly to the intended part of the patient's body. It should be thus used to drain blood and phlegm from the body (Vāgbhaṭa¹). In modern times cupping glasses are used for like purposes in a similar manner.

Vāllūki² describes the alābu yantra thus: "—" The mouth of the instrument is well formed and has the diameter of four anguli. The body has the circumference of eight anguli and is well smeared with a paste of black mud. It is used for drawing out blood". In yogaratnākara", śṛṅga and alābu are directed to be used for extraction of blood from accidental wounds. Caraka mentions the use of alābu for blood-extraction.

Another instrument known as the ghati yantra was used exactly in the same way⁵. It is said to consist of a brass pot

माहादशाङ्गलोऽलावुनां स्व त्या दशाङ्गलः।
 चतुवाङ्गल हत्तास्यो दीनोऽन्तः स्व भरकहत्॥

Astānga Hrdaya Samhitā, I. xxv.

चटाङ्कपरीयाहा चतुरङ्कनालस्थिता समुखी क्रथसदालिता तनु: वेटा
 रक्तावस्थिनीऽलापुरिति।

Vällüki quoted in Nibandha Samgraha I. xiii.

मानदीपयाऽलावा।

Suśruta Samhită, I. xiii.

किन्ने भिन्ने तथा विश्व चित स्यो भिष्मवरः। पहस्तेण संस्ते दं नणं नणविज्ञारदः॥ सृङ्मुंड्यंथा दःखं ना प्राप्तीत नणी नरः। पथवा दीष्यलवणपोटल्या स्तेदयल्मुडः॥ सन्ततया ततलोडपायसंयोगतः क्रमात्। दष्टं रक्तं स्थितं चापि प्रज्ञनाव्यादिभिक्षेत्॥

Quoted in Yogaratnākara,

कित्रागमार्थमयवा श्रद्धलावुभिराइरेत् रक्तम—

Caraka Samhitā, VI. vii.

ै तददघटीहिवा गुका विलयोजमने च सा। Astānga Hrdaya Samhitā, I. xxv. which is still used commonly in India by all classes of people for drinking purposes. A fire should be lit inside as before and the ghați applied to the surface of the body covered by a piece of cloth. It soon becomes firmly fixed and is thus used to raise abdominal tumours by means of it for purposes of correct diagonosis and also to effect its cure by subsidence. It is still used by the common people for the same ends.

Caraka¹ says:—"After the abdominal tumour has been relaxed or softened a little by fomentation and oleaginous application, it is to be covered by a piece of cloth. Then inside a small ghatī, a fire is to be lit by burning kuśa and other forms of grasses; the pot is then to be inverted and pressed over the part covered by the cloth. By this way, the tumour would be drawn upwards i,e, be made prominent. The ghatī is then to be taken away and after removing the cloth, and examining the extent of the tumour, it is to be incised. The different shapes of the incisions are called vimārga, ajapada and ādarša. After incision, the tumour is to be pressed and rubbed with fingers. But the intestines and the heart must not be touched."

The extraction of blood by means of cups, has been practised from remote antiquity. It is interesting to note that both the Latin and Greek terms—cucurbitula and σικια signify a gourd;

[े] सिन्धस्तित्रणरीराय युक्तं शैविल्यमागते ॥ परिवेश्य प्रदीप्तांम्त वल्लजानयवा कृणान् । भिषक् कृषे समावाच्य गुक्तं चटमुखं चिपेत् ॥ स ग्टडीतो यदा गुक्तस्तदा घटमघोडरित् । वस्तान्तरं तत: कला भिन्दाहगुक्तप्रमाणवित ॥

and we know that Alabu also means a gourd. It is curious that the instrument should have been known to the ancient Hindus and Greeks by the same name.

Prosper Alpinus¹ (16th century) who wrote a book on the state of medicine in Egypt in his time, gives drawings of cupping horns he saw there. The horns were those of young bulls, highly polished, with a small hole at the top, by which the air was extracted by suction. To close the orifice a small tab of parchment was taken into the mouth and affixed by the tongue. The Egyptians also used cupping glasses, by suction and not by fire, a method evidently unknown to them.

Hero of Alexandria (B. C. 285—222) describes an interesting form of cup. Milne summarises his account thus: "-"The figure shows a cup of ordinary flattened form, divided into two by a diaphragm. Two tubes pass through the fundus, one passing through the diaphragm, the other not. Each of the tube is fitted with another which is open at its inner end but closed at its outer end and provided with a small cross bar to rotate it. Each of these sets of tubes is perforated by small openings. In the case of the short tubes, these are outside the cup, in the case of the long tube they are inside the cup, in the chamber shut off by the diaphragm. By rotating the piston these openings can be placed in apposition or not at will, thus forming valves. Open valve A by placing the hole in apposition. Close valve B by turning the holes away from each other. The inner chamber of the cup is now shut off except for the small hole A. Apply the mouth to the valve A, and suck the air out of the chamber. Close valve A. Apply the cup to the affected part. The advantage

De Med. Aegyptiorum. Ed. 1541 lib. ii. ch. xii, p. 139.

Grieco-Roman Surgical Instruments, P. 104.

of this arrangement is that the affected part is not directly sucked upon by the mouth; and the instrument is therefore more pleasant for the operator to use".

Celsus¹ thus describes the different kinds of cups:—"There are two kinds of cups, bronze and horn. The bronze is open at one end and closed at the other; the horn, open at one end, as in the previous case, has at the other end, a small foramen. Into the bronze kind, burning lint is placed, and then the mouth is fitted on and pressed until it sticks. The horn is placed empty on the body, and then by that part where the small foramen is, the air is exhausted by the mouth, and the cavity is closed off above with wax and it adheres in the same way as before. Either may advantageously be constructed, not only of these varieties of materials but of another substance. If other things are not to be had, a small cup or a narrow mouthed jar will answer the purpose. When it has fastened on, if the skin has previously been cut with a scalpel, it extracts blood; but if it be entire, air".

Paul² remarks that "those which are made with longer necks and broader bellies are possessed of a strong power of attraction." Both Oribasius³ and Aretacus⁴ allude to them. Antyllus says that there are three materials of which cups are made—glass, horns, and bronze. A good number of such cups occur in the Naples, British and Scottish National Museums.

Celsus. II. xi.

Paulus Ægineta. VI. xii.

[&]quot; Med. Coll. VII. xvi.

[.] De Morb. Acut. I. 10.

Albucasis[†] gives a full account of dry cupping. In applying the instrument he advises us either to create a flame in it, or to fill it with hot water. He gives drawings of various instruments of cupping. Rhases speaks of applying a glass or a cupping instrument to draw off blood after leeching. The other Arabians give little additional information.

In modern times, cupping glasses are used in the same way as before.

V. Śalākā or Rods.

The rods, or pricker-like instruments, or probes are described to be of various kinds and are recommended to be used for various purposes²; so their length and circumference would vary according to some special uses required of them. Susruta³ says:

"There are two kinds of salākā with their ends shaped like the head of the earthworm. They are used for probing abscesses and sinuses.

Two śalākā have their ends shaped like the wing of an arrow. These are to be used for raising any part for the purpose,

Suśruta Samhita, IV. i.

^{*} Albucasis, Chirrug, ii. 98.

नाडीतपान् शल्यनभीनुकार्युत्मिक्तनः प्रनेः।
 करीरवानाङ्गलिभिरेषस्याः वैषयीविषक्।

श्लाकाधनाख्यि नाना प्रकाराणि नाना प्रयोजनानि यथायीगपरिणाइदीघाँणि च तेषां ग्रम्युपद्मरपुद्ध सर्पकण वडीमसुखे दे दे एपण व्युहनचालनाइरणाधंसुपदिश्चेते। मस्रदल्ल-सातसुखे हे किचिदाननाये सीतोमतमञ्जीडरणाये। घट्कापांसकतोणीयाणि प्रमाश्चेन कियास्। चीणि दव्यांक्षतीनि स्वतस्थानि चारीषधप्रणिधानाये। बीस्थनानि जान्वदनानि व्यवाद्धिकसंस्थिति तानि। नासावृद्दहरणायंसिकं कीलास्थिदलसायसुखं स्वव्यतीणीतः। यद्भनायमेकं कलायपरिमण्डलस्थाने सुकुलायः। सूतमागांविशोधनार्थस्वतीणीतः। यद्भनायमभाषपरिमण्डलसितः। Sairuta Sanhita, L vii.

after incision, of extracting any foreign body from it. Others assign to them the function of bringing together the lips of the wound caused by an abscess being opened and emptied.

Two śalākā have their ends shaped like the hood of a snake. They are useful for transferring any material from one part to another. Some of the simple probes used by the ancient Greek and Roman surgeons carried a single or double snake of Æsculapius at one end. But evidently it was meant as an ornamentation and served no useful purpose.

Two salākā have their ends shaped like a fish-hook but are blunt. They are used for extracting any extraneous material from the muscles or bones".

The last six kinds of Suśruta are practically the same as the six śańku of Vāgbhaṭa,¹ which are the following:—

The sanku are six in number. Amongst these, two are twelve and sixteen anguli long respectively. They are used for the purpose of raising a foreign body upwards from the wound.

Two varieties have their ends shaped like the hood of a snake. They are ten and twelve anguli long; and they are used for the purpose of moving a foreign body in the wound in all directions.

Two varieties have the shape of a fish-hook—the ends resembling the stem of an arrow. These are used for the extraction of foreign bodies from the wound.

म्बार्चः पद्भी तेषां पोडणदादशाङ्गुली । व्यक्तिः कि कंषावक्की दी दादश दशाङ्गुली ॥ चालने भरपुढा स्था वाहार्थ्यं विद्याकृतिः ॥२५

Suśruta¹ mentions another pair of śalākā which have their ends shaped like a masūra pulse, and slightly curved; these are used for the purpose of extracting a foreign body from the external outlets of the body such as mouth, nose, etc. They are eight and nine anguli long respectively.

SWAB PROBES.

Six śalākā are used for the purpose of wiping out the principal exerctory canals of the body viz., rectum, nose and ears.² Their ends are covered with cotton like a head-dress (pāgḍī). The two śalākā intended for the rectum, have the lengths of ten and twelve aṅguli respectively for short and long distances. So the two varieties of probes for the ears are eight and nine aṅguli long, while the other two kinds of probes for the nose are six and seven aṅguli long respectively. Some commentators are of opinion that these six śalākā are meant for clearing abscesses.

For similar purposes the Greek and Roman surgeons used the spathomele or spatula probe. Priscianus³ writes: "First of all we must frequently wipe away the clots of blood from the nose

See foot note 2, P. 155.

उभेनखुपदमुखे स्रोतभ्यः शत्यद्वारिची। मस्रदलवक्के दे स्राता मद्यनवाहकी॥२४

Aştanga Hrdaya Samhita, I. xxv.

कार्यां विकितीणीयाः जलाकाः यहप्रमाजने । पायावासाम हरार्थे दे दश बादशाङ्गले । दे यह समाङ्गले शांगे दे कर्षे अन्वाङ्गले ॥२८॥

Ibid.

² Priscianus, xiv.

with the end of a spathomele wrapped on the 'berry' with soft wool, and then occlude it by plugging with wool in the same way."

The use of probes, having the ends wrapped with wool, for wiping out discharge of pus from the ears of horse, is mentioned by Jayadatta Suri¹ in his Treatment of Horses.

SPOON-SHAPED PROBES.

Three probes are described to have their ends shaped like a khala or mortar with a conical cavity, and so they resemble a spoon. They are to be used for the purpose of applying caustic solutions, etc.²

Similarly cyathiscomele, which is a variety of spathemele in which the spatula is replaced by a spoon, is said to have been used by the Greek surgeons to mix, measure and apply medicaments. The specimens of these instruments occur in the Naples Museum. Sometimes the edge of the spoon is sharp and is recommended to be used as a curette. Scrivonius Largus directs us to use the spoon of an car specillum for the application of causties to hamorrhoids.

Aśvavnidyaks, Ch. 34, v. 2, and 3.

प्यस्तविष जानीयात् शोधमध्यनरोडम् । पिनुना वेष्टयिता तु शलाकारं समाहित: ॥ तेन कर्णांनरे पूर्व कर्षयिता विचचणः । पातितस्य सवदस्य प्रयोग्यधमपिषा ॥

NAIL-SHAPED PROBES.

Vāgbhaṭa¹ describes three other probes for the same purpose.

They are eight anguli long; their ends are bent and resemble in size and shape the nails of the third, fourth, and fifth fingers respectively.

Paul² mentions a nail-shaped probe in the treatment of bubonecele. But this was applied as a cautery and not for the application of medicaments. Nail-shaped cauteries are also referred to by Hippocrates³ in the treatment of recurrent dislocation of the shoulder-joint.

JAMVOVAUSTHA PROBES.

Three probes are called Jāmvovoustha for their ends are shaped like the fruit of Jambul tree (Eugenia jambolanum).⁴ Three other śalākā have their ends shaped like ańkuśa or elephant driver's goad.⁵ They may be made of any length required

> अष्टाहुला निवसुखा सिखः चारीयच कमी। कनीनी-मध्यमाऽनामी-नखमान-समैस्कैः॥

> > Aştanga Hıdaya Samhita, I. xxv.

- Paulus Ægineta, VI. lxv.
- ³ Hippocrates iii, 15,
- * See foot-note 2, P. 155.

शलाका जास्वीष्टानं चारिशी च प्रथक् वर्ध। युद्धात स्थलान द्रीषांनां,

f Aştanga Hrdaya Samhita, I. xxv.

For the diagram of the ankuśa see Fergusson's Tree and Serpent Worship; Plate xxxiii, Sanchi, xxxviii, fig. I, and xxxviii, fig. I & 2.

² See foot-note 2, P. 155.

by the surgeon. These six varieties are recommended for the purpose of applying caustic medicaments and the actual cautery.

Paul¹ mentions a gamma-shaped cautery in the radical cure of hernia. This cautery is shaped like the Greek letter r; so it resembles the ańkuśa cautery of the Hindus. The ańkuśa is similar in appearance to the Greek letter.

One variety, which is used for the purpose of removing a tumour from the interior of the nasal cavity, has its end shaped like a khala or mortar, with sharp edges, and of the size of half the stone of the fruit of the jujube tree (Ziziphus jujuba)². Vāgbhaṭa³ mentions a similar probe for the purpose of applying actual cautery to a nasal tumour. Its end resembles in shape and size, a half of the stone of the fruit of the jujube tree.

This spoon-shaped probe of the Hindus is comparable to the curette like sharp cyathiscomele of the Greeks, noted before.

COLLYRIUM PROBES.

For the purpose of applying collyria to the eyes, a rod is mentioned having the length of eight aŭguli and the thickness of a pea. Its both ends are shaped like buds⁴.

The probes for applying collyria to the eyelids, should be six anguli long, with a rounded bulbous end. They may be made of gold, or silver, or copper, or iron, or stone. For the habitual use of collyria, a lead probe is prescribed. When medicines are directed

Paul, VI. Ixii.

² See foot-note 2, P. 155.

[ै] कोलास्त्र दल तुल्हा स्वा नामागीं, व्युंद दाहकत्॥

Aştănga Hrdaya Samhită, I. xxv.

^{*} See foot-note 2, P. 155,

to be applied not only to the lids but also to the conjunctiva, the finger is recommended as it is a softer and safer instrument. Again the probes would vary according to the nature of the collyria to be used. As for the application of lekhana collyrium, the probe should be made of copper and should be ten anguli long. The probe is advised to be made thinner at its middle to afford a firm grasp by the surgeon. The ends are shaped like buds. For applying ropana collyrium, a similar probe is to be used, but it should be made of steel; while for the application of a collyrium for the improvement of the visual strength, a probe made of gold or silver, and having the size and shape of a finger is recommended by Cakradatta.

Susruta² likes a probe of steel, or bell-metal, or copper for lekhana collyrium; and of gold, or silver, or horn, for ropaṇa and snehana collyria. The probe should be eight anguli long, and the eye is to be kept open and fixed by the left hand, while the right hand is to hold the probe, and so the collyrium is to be applied to the eye.

- े दशाहुला तनुर्मध्ये मलाका मुक्तलानना ॥

 प्रमला लेखने तासी रोपणे काललोइना ।

 पहुलीव सुवर्णीत्वा रूप्यजा च प्रसादने ॥

 Cakradatta Āschyotana Cikitsā.
- तथां तुल्यगुणानीव विदध्याद भाजनान्यपि । सीवखं राजतं शाङ्गेनासं वैदृष्यंकांस्वजं ॥ भायसानि च योज्यानि शलाकास यथाक्रमं । वक्वयोग्म्ं जुलाकारा कलाय परिमखला ॥ भटाङ्का तनुमेध्ये सुक्तता साधनियदा । भीड स्वयंग्मजातानि शारीरी ॥ हिता भवेत् ॥

Sušrutu Samhitā, VI. xviii.

Sărugadhara¹ says: "The collyrium probe should be made of stone or metal. It should be eight auguli long and its ends must be made smooth and rounded like a common pea. For lekhana collyrium, a copper, or iron, or stone probe is to be used, while for ropana collyrium the tip of the finger is recommended for its softness."

Of the probes used by the Hindus for applying collyrium to the eyes, fortunately we possess a few specimens. Among the objects of interest found in the excavations at Bijnor, we find, "fourthly, one copper salai or instrument for applying antimony to the eye, similar to those found in the Bihat excavations."²

> मुख्यो: कृष्टिता यच्चा मलाकाष्ट्राक्षेतिता। अप्रमण धातुजा वा स्थात् कलावपरिमणला।। तास्त्रीचामसंजाता मलाका लेखने नता। सुवर्णरणतीङ्कृता मलाका सेइने भता। खङ्गलीच सट्लेन कथिता रोपण वृधै:॥

> > Šārāgadharu Sarāgraha, III. xiii. Yogaratnākara, Eye Discasea, P. 823,

विष्णस सिलस्योगे सङ्गराजद्वे च इविषि च विषकक्के चीर चाले मध्ये। प्रतिदिनम्य तत्रं सप्तथा सीसमेकं प्रणिहितस्य प्रयात् कारयेत् तच्छलाकाम्॥ स्वितुबद्यकाले साझना व्यवना वा करकरिकसमेतानस्यपैक्यियोगान्। असितसित समुत्यान सिव्यकांभिजातान् इरित नयनरोगान् सिव्यमाना शलाका।

Cakradatta, Netraroga Cikitsa.

^{* &}quot;Vide Princep's (Thomas') Indian Antiquities, fig. 18, pl. iv" J.A.S.B. IX. 1.7.

Specillum with two olivary ends formed a variety of probe of the Greek and Roman surgeons. It was used as an ordinary probe in dealing with crooked fistulæ, and as a cautery to destroy the roots of hairs after epilation. Sometimes it carried an eye in one of its olives and was used in the treatment of nasal polypus. The eye was threaded with a cord having many knots along it. The other end of the probe was pushed through the nose and withdrawn by the mouth, and then by a sawing movement of the cord with both hands of the surgeon, the polypus was removed.¹ A single probe for the application of semi-solid medicaments, occurs in the outfit of the oculist of Rheims, in the museum at St. Germain-en-Laye and is figured by Milne.²

KARNA-SODHANA OR EAR-CLEANER.

This salākā is said to have its end shaped like the end of a leaf of Asvattha (Ficus religiosa). The instrument looked like a sruva—one of the famous spoons used in sacrificial ceremony.³ It was used for the purpose of extracting wax from the ears.

The different kinds of spoons used in the ancient Hindu ceremonies were as follows: "Three different sruk or offeringspoons are used viz., the guhu, upabhrit and drubha. They are made each of a different kind of wood, of an arm's length (or according to others, a cubit long) with a bowl of the shape and size of the hand, and a hole cut through the bark and front

¹ Paul VI, lxxxvii, VI, xiv, VI, xxv.

^{*} Grace-Roman Surgical Instruments, pl. xi. fig. 5.

^क जार्थशोधन सम्बद्ध पत प्रातः सनाननं॥

side of the bowl and fitted with a spout, some eight or nine inches long and shaped like a goose's bill. The sruva or dipping-spoon, on the other hand, chiefly used for ladling the clarified butter (or milk) from the butter vessel into the offering-spoons, is of the khadira wood (Accacia catechu), a cubit long, with a round bowl measuring a thumb's joint across and without a spout".

So we see that the bowl of the karna-sodhana was round in shape.

Suśruta also mentions a śalākā for the extraction of cerumen or minute insects from the ears, ² Cakrapāṇi³ alludes to it. In modern times, the ear-cleaner, as used commonly in India, is a tāla yantra. Ear specillum is frequently mentioned by the Greeks and Romans. It consisted of a small narrow scoop at one end and a simple probe at the other. The use of the scoop is thus described by Archigenes⁴: "If a bean, stone, etc. fall into the ear, remove it with the small narrow scoop of the ear specillum". Celsus⁵ directs us to extract a scab or cerumen by means of the ear specillum.

The ear scoop used by the modern surgeons is a narrow scoop, more like the Hindu pujā vessel known as kuśi. The ear scoop is often made in combination with a director.

Cakradatta, Karnaroga.

Satapatha Brahmana, Sacred Books of the East. 1. 3. 1. 1. foot-note.

See foot note 1, P. 149

क्षेद्यित्वा तु तैलीन स्वेदेन प्रविलाध्य च।
 ग्रोधयेत् कर्णगृयसा भिषक् सस्यक् शलाकया॥

Galen, XII, 652.

⁵ Celsus, VI. viii.

GARBHA-ŚANKU. FOETUS OR TRACTION HOOK.

The end of this instrument is said to have been bent like ankusa or elephant driver's goad. It is described to have the same length as the other sanku have i. e. ten to sixteen anguli, and it is eight anguli in width. It is recommended for extracting a dead fectus from the mother's womb, after perforating its head by the mandalagra or mudrika knife. Susruta recommends us to perforate the head and then to extract the bones by the sanku or hook, and lastly to apply traction by fixing it about the chest or axilla. If the head can not be perforated, it is to be applied to the eyes or cheeks.²

Traction hook for extraction of a dead feetus was well known to the ancients. Hippocrates bids us break up the head of the feetus with a cephalotribe and remove the bones with bone forceps, or deliver it by a traction hook inserted near the clavicle. Celsus advises us to insert a smooth hook with a short point and to fix it in the eye, or the ear, or the mouth, or the forehead, and so the feetus is to be dragged down. Soranus points out the best places for the insertion of the hook to be the eyes, the occiput, the mouth, the clavicles, and the

Aştānga Hrdaya Samhitā I. xxv.

Susruta Samhita, IV. xv.

नतोऽये शङ्गात्ता सभै शङ्गितिसृतः।
 अटाङ्वा यतसीन सृदगभै हरित् सियाः॥ १६।

[ै] त्तव स्तियमाधास्य मण्डलीयेणाङ्गुलीयस्त्रेण वा शिरोविदार्थ्य शिरःकपालान्याञ्च श्रद्धना स्ट्रीत्वोरस्य कचार्या वापडरेदभिन्ने शिरसि चाचिक्टे गन्डे वा।

³ Hippocrates, II. 70.

[·] Celsus, VII, xxix.

ribs in head presentations; and the pubes, ribs, and clavicles in footling cases. Soranus, Aetius and Paul direct us to extract the feetus in the same way but they recommend us to use two hooks instead of one, in order that the pulling may be straight down and not to one side.

Albucasis, 4 Rhases, 5 Haly Abbas, 6 and Avicenna 7 give similar directions for opening the child's head and for delivering the fectus with hooks.

This purpose in modern times is served by the blunt hook and crotehet.

YUJÑA-ŚANKU OF MIDWIFERY FORCEPS.

An instrument is thus named and figured by modern writers on Hindu surgery, bearing some resemblance to the modern forceps, for extracting the child alive. We have, however, no mention of any such instrument in the works of Caraka, Suśruta Vägbhata and other ancient authorities. The Greeks and, Romans were also ignorant of it; and the Arabians fared no better, though Adams, in his commentary on Paul⁸ asserts that Avicenna refers to forceps for the delivery of living childern. Mulder, in his valuable work, gives an extract from a translation from the works of Avicenna supporting

¹ Soranus, II, xix,

[.] Actius. IV. iv. 23.

^{*} Paul, VI. lxxix.

^{*} Albucasis, Chirrag, II, 76 and 77.

Rhases. Cont. xxii.

⁶ Haly Abbas, Pract. ix. 57.

^{*} Avicenna_jii. 21, i, 24.

^{*} Paiffus, Æginita. III. lxxvi.

[&]quot; Historia Forcipum et Vecticum. p. 6.

the same conclusion. Smellie1 says: "With regard to the fillets and forceps, they have been alleged to be late inventions; yet we find Avicenna recommending the use of both. The forceps recommended by Avicenna is plainly intended to "He recommends all the old methods for save the fœtus". assisting in natural labours; and if the woman can not be delivered by these, he orders a fillet to be fixed over the head: if that can not be done, to extract with the forceps; and should these fail, to open the skull; by which means the contents will be evacuated, the head diminished, and the fœtus easily delivered."2 Playfair also holds the same view. The point is however by no means settled. For Milne4 says: "A full consideration of Avicenna's words seems to me to lead to the conclusion that he is describing no more than extraction with a craniotomy forceps. If the forceps fail, the child is to be extracted by incision, as in the case of a foctus already dead (and decomposed so that the forceps would not hold)."

Thus we may be sure that there is no available evidence of the use of delivery forceps by the Hindus, Greeks, Romans and Arabs; and the Chamberlens are still the undisputed claimants to the glory of the invention.

But there is no doubt that the Hindu surgeons tried extraction of the living feetus by manual traction. The hands are recommended to be well oiled and introduced into the uterus. If the child be dead, sharp intruments are advised to be intro-

^{*} reco-Roman Surgical Instruments, p. 156.



¹ Smellie, Treatise on Midwifery, p. 40.

Thid, Edited by McClintock. New Syd, Soc, vol. I. Introduction p. 50.

Researches on Operative Midwifery, p. 10.

duced into the vagina for cutting upon the fœtus. But on no account such instruments are to be used so long as the child is alive.¹

SARPA-FANA OR SNAKE'S HOOD.

It is also called agra-bakra i. e. the end bent. It is a śańku or hook similar to the above, the end being bent like the hood of a snake.² It is to be used for the purpose of extracting stone after operation.

Susruta, in the operation for extraction of stone through the perineal incision, directs us to use the agra-bakra to bring the entire stone out of the wound. But in the ease of females, he recommends us to use a knife having a spoon like a scoop, to prevent the formation of a vescico-vaginal fistula. Is it a spoon-shaped knife, or is it a double instrument on a handle—a knife at one end and a scoop at the other? The Greeks used a knife having a scoop at the end.

गर्भे जीवित मुद्रंतु गर्भ यव न निर्हरेत्। इसोन सर्पिवाल न योनेरन्तर्गतेन सा॥ सते तु गर्भे गर्भिन्या योनी शस्त्रं प्रवेशयेत्। शस्त्रशास्त्रार्थविद्यी लघुडसा भयोजिङ्कता। सचेतनं तु शस्त्रेन न कष्यचन दारयेत्॥

Yogaratnākara, Muddhagarva Cikitsā.

चामव्योद्धरणं सर्पभणावदक चरतः ॥

Aştānga Hrdaya Samhitā, I. xxv.

ग्रथा च न भिदाने न चुल्यं ते वा तथा प्रधनेत चुल्यं नत्यमण्यविद्यतं हि पुनः परिवृद्धिमिति तकात् समलामणवक्षे लाददीत । स्वीलान् वित्तराचं गती गभाग्यः सिक्कष्टः तथावा सामृत्सवा व्याप्ति ।

Celsus¹ describes the extraction of stone through a perineal section by means of the lithotomy scoop. "The scoop is slender at the end and flattened out in the shape of a semi-circle, smooth externally where it comes in contact with the tissue, rough internally where it meets the calculus". It was a long hook-like instrument.

Actius² mentions a special stone extractor, under the treatment of calculus in the female. Some understand by it the lithotomy forceps.

In modern times we use the lithotomy forceps and scoop for the same purpose.

I take this opportunity of referring to the celebrated passage in the famous Hippocratic oath, which runs as follows: "I will not cut persons labouring under the stone, but will have this to be done by men who are practitioners of this art". This sentence has given a good deal of trouble to the commentators and they have failed to understand the true reasons as to why Hippocrates specially forbade the practice of this operation. "M. Littré finds some difficulty in accounting for the circumstance that the noviciate in surgery is interdicted from the operation of lithotomy." Adams, commenting on the sentence, says: "Why this operation was proscribed, can not indeed be satisfactorily ascertained," and he quotes the Arab Physician, Avenzoar⁴, who "pronounces the operation to be one, which no respectable physician would witness, and far less to perform."

¹ Celsus, vii. xxvii.

² Actius, IV. iv. 94.

The Genuine Works of Hipprocrates. Vol. II. P. 777-8.

Avenzoar, II. 2, 7.

The explanation that this was proscribed because there were men who devoted themselves exclusively to this kind of treatment, and that if the qualified surgeons be allowed to practise the operation, they would interfere in the sphere of action of the lay lithotomists, cannot be considered satisfactory. For the question still remains the open one, why should Hippocrates proscribe this operation from the domains of scientific surgery, simply because a few laymen happened to practise it.

The real explanation is that in Hippocrates' time success in the operation was very difficult to achieve, consequently he interdicted the operation much in the same way as abdominal operations were considered sacred before the days of antiseptic surgery. It is curious to find that Susruta calls this operation the worst of all surgical operations, for he says¹: "Even experienced and able surgeons fail to attain success by operation for the stone. So the surgical treatment is the worst of all treatment here. But if you do not operate, the patient will die; and it is doubtful whether he will live after the operation; so give him the chance of operation in God's name." I do not know whether this passage of Susruta has any causal relation to the remarks of Hippocrates, but there is no doubt that the former serves as a better commentary on the latter, than anything hitherto suggested.

Adams2 says that this operation was practised by a class of men,

कुशलाम्यापि वैद्यस्य यतः सिडिरिशाधुवा । उपक्रमी जधन्योऽयमतः स परिकौरितः ॥ श्रातियायां ध्रुवी सत्युः कियायां संश्रयो भवेत् । तस्यादाप्रच्छा कर्तवासीवरं साधकारिया ॥

Saśruta Samhitā, IV. vii.

Commentary on Paulus Ægineta, Vol. II. P. 363.

separate from the surgeons, in all countries in ancient times, and points out that the ancient operation of lithotomy is still practised with great success by the native doctors of Hindusthan. No conclusion is, however, to be drawn from the modern practices in India, as we find separate classes of men not only for stone, but also for bone-setting, cataract, etc. And whatever may be the practice in modern times, we find that during Susruta's time, the operation was not the privilege of the laymen.

Śаваримкна-микна Реове.

This instrument is also described to have its end bent like the hood of a snake. It is four anguli long and is recommended to be used for the purpose of extracting a tooth from its socket.¹

Tooth elevator or instrument for levering teeth is mentioned by Galen.² It is of the same size as the bone lever which, according to Paul,³ is seven or eight anguli long.

This instrument recembles in shape and action the tooth elevator of the modern surgeons.

ARDHACANDRA-MUKHA SALA. HALF-MOON PROBE.

The first half of this variety of salā is curved like a half-moon, to which is attached the second half as a rounded handle.⁴ Suśruta advises us to use it for the purpose of applying actual

Aştānga Hydrya Sambitā. I. xxv.

मध्योवं इसदन्याच मूले चावन्द्रसमिमां ॥

¹ शरपुङमुखं दनापातनं चतुरङ्खम् ॥

E Galen, xviii, 593.

⁵ Paulus Ægineta, VI. evi.

शलाकामस्वयम नि ।

cautery to the groin in bubonecele, to prevent the hernia from entering into the scrotum.¹

A crescent-shaped cautery was also used by the Greek and Roman surgeons. So Paul² says that in cases of sloughing of the prepuce we must cut it off and use lunated cauteries to stop hæmorrhage and prevent the spreading of the wound. Again he mentions a cautery shaped like the Greek letter Γ, in the radical cure of hernia.³

BONE LEVER.

Instruments for levering fractured bones into their proper positions are mentioned several times by Suśruta. In the treatment of fracture of the nasal bones, a śalākā is recommended to be used as a bone lever for raising and depressing the fractured ends. Sometime a muşala or pestle is advised to be used. It is a thick wooden pestle the end of which is plaited with iron. It is still used to strike upon paddy to seperate the husk from the rice. Suśruta mentions its use to reduce dislocations of the joints of the shoulder and neck.

तत या वहचस्या ता: दहेदई-सुवक्रया। सम्बग्नागांवरोधार्थं कोशप्राप्तां तु वर्ष्यंत्र॥

Suśruta Samhitā, IV. xix.

^{*} Paulus Ægineta. V1, lvii.

³ Ibid, VI, lxii.

^{*} नामां मन्नां विड्यां वा कर्ज्यां क्रत्या शलाकशा। . Sufruta Samhiti, IV. iii.

मझसुत्रमयेत् स्तित्रमचकम् स्यक्तिग तु ।
 तथोक्षतं पीड्येच वशीयाद्वाटमेव च ॥

Ibid.

तेलपूर्य कटाई वा द्रोखां वा शावयंत्ररं॥
 स्पर्मतोत्विपेत् कवानांसससी विसंहते।
 स्यानास्थितच बधीत समिकन विचचणः॥

The pestle was also used by Hippocrates¹ to reduce dislocation of the shoulder joint. He says: "Those who accomplish the reduction forcibly bending it round a pestle, operate in a manner which is natural. But the pestle should be wrapped in a soft shawl (for thus it will be less slippery), and it should be forced between the ribs and the head of the humerus. And if the pestle be short, the patient should be seated upon something, so that his arm can with difficulty pass above the pestle. But for the most part the pestle should be longer, so that the patient when standing may be almost suspended upon the piece of wood. And then the arm and forearm should be stretched along the pestle, whilst some person secures the opposite side of the body by throwing his arms round the neck, near the clavicle"

The bone lever used by the Greeks is thus described by Paul: "It is an instrument of steel about seven or eight fingers' breadth in length, of moderate thickness that it may not bend during the operation, with its extremity sharp, broad and somewhat curved."

DIRECTOR.

Suśruta³ mentions the use of eṣaṇī or metallic probes not only to ascertain the course of the fistulous track but also to raise the bridge of skin covering the sinuses, so that the surgeon may operate on it as a guide. Cakradatta⁴ also uses a probe to

¹ The Genuine Works of Hippocrates. Adams' Trans. p. 372.

² Paulus Ægineta, Vi. evi.

पक्षेषु चीपसिन्धमवगाहिसद्रं ग्रथ्यायां सिन्नविग्यार्थसमिव यन्तवित्वा भगन्दरं सभीचा
 पराचीनमवाचीनं वा विहम्भुंखननार्भृत्यं वा ततः प्रशिधावैषणीमुद्रम्य सागयमुद्धरेच्छलेण
 Suferita Samblită, IV. viii.

[े] नाडीनां गनिमन्त्रिष्य शस्त्रेनापान्य कर्यावत्। Cakradatta, Nädivraņa Cikitsā.

learn the direction of the wound before operation. It is also mentioned in the Yogaratnākara.

In the treatment of fistule, Celsus² also says: "A director being inserted into them down to their termination, the skin ought to be incised." It is not mentioned that the eṣaṇī or probe was grooved, but there is no doubt of its use like a grooved director, so common nowadays. The discovery of such a director, along with several other surgical instruments, which are preserved in the Musee de Cinquantenaire, Brussels, proves that it was known to the Romans.

URETHRAL PROBE.

A variety of śalākā is described by Suśruta a to have its end rounded like the stalk of a mālatī flower (Echites caryophyllata, Rox.) It is to be used for cleaning the urethral canal.

Caraka is mentions a probe for examining the direction of the urethral canal and its pathological condition, before introducing the tube of the urethral or bladder clysters into it.

Yogaratnäkara, p. 346.

Suśruta Samhitä, I. vii.

[।] नाड़ीनां गतिमन्वीत्य शस्त्रे गोत्पाद्य कर्यावत् ।

^{*} Celsus, VII. iv. Grzeco-Roman Surgical Instruments. p. 73.

अस्त्रमामीविशीधनाधै एकं मालनीपुण्डनायप्रमाण परिमण्डलमिति।

चनी: सुखोपविष्टस्य इटे मेट्टे इतान्ति।
 भनाक्यान्तिय गति यदाप्रतिहता अजित्॥
 तत: श्रीफ:प्रमाणिन पुष्पनेवं प्रवेशयेत्॥

Class VI. The Upayantra or Accessory Instruments.

The sixth class of the blunt instruments comprises the upayantra or accessory instruments. By surgical instruments, the Hindus consider not only the instruments proper, but also any mechanical aid by which the object of the surgical treatment is attained. Thus even medicinal agents are considered under this head for they help the inflammatory swellings to subside, or suppurate, or burst open as by various external applications. The accessory instruments are:

1. RAJJU OR THREAD.

As an example of thread being used as an instrument of surgery, we know that the thread smeared with caustics are recommended by Suśruta¹—kṣāra sūtra or caustic thread—for the operation of fistula²in-ano. For further informations on the subject see "Eṣaṇī or sharp probes" under the Śastra.

Thread as a material of phalavarti or tent is mentioned by Sārngadhara.² If after a vaginal or intra-uterine douche, the injection does not flow out, he advises us to introduce a strong tent made of thread, dipped in oleaginous medicines of the

क्रगदुर्वलभीक्षां नाड़ीमसंयिताच या।
 चारस्वेन किन्यावतु शस्त्रेण वृद्धिमान्॥

Sušruta Samhitā, IV, xvii. Cakradatta, Nādīvraņa Cikitsā.

फलविं निदध्याद्या योनिमार्गे इट्टं भिषक्।
 म्वैदिनिर्मातां सिन्धां शोधनद्रव्यसंयुताम्॥

Saragadhara Samgraha, III. vii

sodhana (Purifier) group. Cakradatta¹ uses caustic threads in the treatment of piles by ligature.

2. VENIKĀ OR TWINE.

The use of twine as a ligature to be applied above the part bitten by a snake to arrest the circulation of blood towards the heart is mentioned by Suśruta.² Caraka³ also advises us to tie ligatures above and below the bitten part, then to squeeze out the poison towards the wound, whence it is to be drawn out through incisions made by a knife.

3. PATTA OR BANDAGES.

For the proper application of bandages, Suśruta mentions the following materials to be necessary: ** viz., cloth manufactured

> े भावितं रज्जनीचूर्णें: खुडीचीरे पुन:पुन:। वस्त्रनात् सुदृदं सृतं भिननाशीं भगन्दरं॥

Cakradatta, Arsaroga Cikitsā.

" सा तु रज्यादिभिवंता विषश्रतिकरीमता।

Susrnta Samhlta, V. v.

वंशात्तु विषंदष्टस्य विसतं विशिकां भिषक् वडा। निषीइयेदस्यां दंशमृहरेन्द्रस्यं वर्ज्ञम्॥

Caraka Samhita, VI. xxv.

" अत कर्ड अणवस्थन द्रश्याख्यपदिवानः । तदाया चीमकापांसविकद्वृत्त कीग्रेय प्रवीर्ण चीनपद्रचर्यानःश्रेक्कलालावृग्रकललता विदलरज्युत्लफलसन्तानिका लीडानीति तेषां व्याधि कालं चिवित्रोपधीगः प्रकरणत्यैषामादेशः । तव कीश्रदामस्वसिकान्विद्वितप्रतीली-मस्बलस्यिविवायमकस्वद्वाचीनविवस्थवितानगीफणाः प्रधाद्यी चिति चतुर्दश्यवस्थविशेषाः ।

तेषां नामभिरेवाक्तत्यः प्राधिवध्याख्याताः। तचकोशमङ्गुष्ठाङ्गुलिपञ्चेस् विदध्यात्। दाम सम्बाधिऽक्षेः। सन्धिक वैकथुमनानारतलकर्षेष् स्वसिकं। चन्विक्षितन् शाखासु,। यौवामिद्योः प्रतीलों। इतेऽक्षे मन्द्रले। चङ्गुष्ठाङ्गुलिमेद्र्येषु स्वशिकां। यमलवव्ययी यमकं। इनुष्ठवन्त्रसंखु खद्यां। चपाङ्गयोयीनं। पृष्ठदरीरःसु विवन्तं। सृदेखि वितानी चित्रकनासीष्ठाः सवनिष्यु बोफवां। जव्याकदे प्रवाङ्गीमिति। यो वा यखिन् श्ररीर प्रदेशि सुविविद्यो भवति तं तस्तिम् विदध्यात्।

from the fibres of plants, flax, cotton, wool, blankets, silk, leather, Chinese cloth, inner barks of trees, bark of bottle gourd (Cucurbita lagenaria), tendrils of twining plants, cane or pieces of split bamboo, rope, fruits as those of Bombax Malabaricum, blades of knives, and plates of metals as gold, or lead, or iron. These articles should be used with due consideration as regards the nature of the disease, the time of their use and the purpose in hand. He describes fourteen varieties of bandages as follows:—

- Kośa:— a hollow cylinder or sheath to be applied to the joints of the thumb and fingers. This form of bandage is to be applied over the stumps after amputation of the limbs.
- Dāma (i.e. tail of a quadruped?):— it is a large bandage to be tied round a part for the relief of pain or cramps.
- 3. Svastica or a circular cross-bandage:— it is to be applied round the joints, the space between the tendons of the great and second toes, the intermammary region, the glabella (space between the eyebrows), the plantar surfaces of the feet, the palmer surfaces of the hands, and the ears. It is also the form of bandage recommended in dislocations of the shoulder joint.
- 4. Anuvellita or an encircling bandage:—it is to be applied to the limbs. This form of bandage is recommended to be applied to the limbs in cases of oblique, deep, and large cuts inflicted by a knife. A leather bandage applied in the form of gophanā would also serve the purpose. The encircling bandage is also advised in cases of fracture of the ribs.
 - 5. Protoli: a broad bandage for the neck and penis.
 - Mandala or a circular bandage:— it is to be applied to 23

the round parts of the body such as the arms, sides, abdomen, thighs, and back.

- 7. Sthagikā or a supporter:— a bandage enclosing a splint and pastes of medicaments to keep the parts firm. It is to be applied over the ends of the thumb, fingers, and penis. Susruta directs us to use this bandage round the serotum after tapping the hydrocele.
- Yamaka or a double-bandage:— a pair of circular bandages applied to a couple of ulcers on a part.
- Khatvā or a four-tailed bandage:— it is recommended for the temples, cheeks and lower jaw.
- China or a banner bandage :— a bandage for the inner angles of the eyes.
- Vivandhana or a circular chest-bandage:— it is the bandage for the back, abdomen and chest.
- Vitāna or a canopy bandage :— a large bandage for the head.
- Gophană¹ (lit. a sling for throwing stones):—
 a concave bandage for the chin, nose, lips, shoulders and pelvis.

Suśruta Samhitā, IV. ii.

पादी निरससुभस्य जलीन प्रोचा चाचिया। प्रवेक्त तुत्रसेवन्या सुष्की सीवित्रतः परं॥ कार्थ्यों गोफविकावन्यः कच्छामावेक्त यनाकं॥

शाखाम् प्रतितां सिर्ध्यक् प्रहारान्विवतान् स्यां। सीर्व्यत् सम्बद्धिवेदवायः सम्बद्धीन्यनुपूर्व्ययः॥ वडा वैज्ञितकेनायः ततसैलेन सेचयेत्। चर्माना गोफशावन्यः कार्थ्यो यो वा हितो भवेत ॥

14. Pañcāṅgī or a five-tailed bandage¹:— it is intended for the parts above the clavicle, as in the dislocations of the lower jaw. Caraka² mentions a bandage called kavalikā, to be tied tightly after setting a fracture or reducing a dislocation. It is so-called from the medicinal paste which is applied to the affected parts, underneath the splints.

Dunglison mentions a bandage called Accipitar to be applied over the nose. It is so called from its likeness to the claws of a hawk. It resembles the pañeāngī bandage of the Hindus.

So the bandages are recommended to vary according to the different parts of the body; and the surgeon, using his discretion, is to select the form of bandage suitable to the part. The bandages are recommended to be firmly secured to their place by three strings, applied upwards, downwards and obliquely. The knot is avoided over the seat of ulcer and tied on a side.

Suśruta says: "Bandages are applied with three degrees of tightness according to the seat of the abscess:—

1. A tight bandage causes uneasiness but not actual pain;

2. A loose bandage is loose and relaxed; 3. An even bandage is properly applied—neither tight nor loose. The tight bandage is to be applied to the buttocks, sides of the abdomen, axilla, groin, chest and head. The eyes and joints

[े] इत्यस्थिनी समानीय इतुस्त्री विसंइते । स्वेदयिता स्थिते सम्यक् पश्चाङ्गी वितरिश्चिक्॥ Sufruta Samhitā, IV. iii.

शब्धभग्नं च्युतं सन्धिं संदधीत समं पूनः। समेन सममन्नेन क्रतान्येन विश्वचयः॥ स्थिरः क्रवलिकावन्यः क्रिकाभिय संस्थितम्। पदेः प्रभूत सपिंकाविग्रीयादवलं सखां॥

are loosely bandaged. The even bandage is for the extremities, face, ears, neck, penis, scrotum, back, sides, and abdomen."

Suśruta next deals with the alterations in the mode of applying bandages according to the rules laid down. He also advises the surgeon to be guided by the dictates of his common sense. He directs us to practise bandaging on the various large and small limbs of a human figure made of cloth or clay.²

With regard to the mode of application of bandages, Hippocrates says: "It should be done quickly, without pain, with ease and with elegance, it should fit well and neatly. The forms of it are the simple, the slightly winding (called ascia), the sloping (sima), the monoculus, the rhombus, and semi-rhombus".

The whole chapter of Susruta is very interesting and will repay perusal. If bodily transferred, it will adorn any modern text book on surgery.

As it is very difficult to covey a correct idea of these bandages in words, I have given figures of them from modern works on surgery, from which their construction and uses will be readily understood at a glance.

तत त्रणायतनविश्वेषादन्य विशेषास्त्रविधो भवति गाटः समः शिथल इति। पौड्यन्नक्जो गाटः सोच्छामः शिथलः खृतः। नैव गाटो न शिथलः समोवन्यः प्रकीत्तितः।

तव स्मिक् कृषि कवावक्षीर: शिर: सुगाद:। शासावदन कर्णकणः सेंद्रसुण्णपृष्ठपार्थी-दरस्स सम:। चली: सन्धिषु च शिथिल इति।

Sušruta Samhlitā, I. xviii.

पुस्तमय पुस्त्वाङ प्रत्यङ्गविशेषेषु वन्धयोग्य'।

Ibid, I. ix.

³ The Genuine Works of Hippocrates, Vol. II, P. 477, Syd. Soc. Ed.

ABDOMINAL BINDER.

Caraka¹ mentions the use of abdominal binder for the recently delivered woman to prevent derangement of air by its expansion in her abdomen.

Dr. Barnes says: "The sudden expulsion of one-tenth of the body-weight from the abdominal cavity is attended by a sudden removal of a force hitherto pressing upon the vessels and organs of the chest, abdomen, and pelvis. This entails in some cases a tendency to vacuum. Hence disturbance of the circulation. Now the binder, by supporting the abdominal walls, restores the equilibrium of pressure. The pressure exerted upon the uterus works as a gentle continuous stimulus to contraction. The woman is conscious of the support and is greateful for it.

. . . . The figure, so precious, and rightly so, to women, is better preserved So applied, the binder becomes one of the most efficient agents in antiseptic midwifery; it keeps the walls of the uterus and vagina in contact, thus preventing the collection of fluids or clots, and shutting out air".

The use of cloth for other surgical purposes is also mentioned:—

FIELD HOSPITAL.

The cloth is to be used for the manufacture of tents for the doctors to live in. The wounded in war are to be treated in such tents. The tent of the surgeon-general should be close to that of the king in the battle-field.³

[े] विष्ट्येंट्टरं महता वाससा तथा तसा न वायुक्टरे विक्रतिसुत्पादयत्यनवकाशत्वात्। Caraka Samhita, IV. viii.

Obstetire Medicine and Surgery, Vol. II. p. 87.

कश्वावारे च महति राजगीहादननारं। भवेत सित्रहितो वैद्यः सर्वोपकरणान्तितः॥

Small tents are also recommended for applying vapour bath to patients.

DRESSINGS.

Didhavala¹ mentions the use of medicated gauzes to be used as sponge by the females and says: "In discharges from the vagina, pieces of cloth soaked in decoction of barks of Vata (Ficus Bengalensis) and Lodha (Symplocos racemosa) and dried, should be put inside the canal."

In the Mohāvāgga² we find the use of itch-cloth:—
"I allow, O Bhikkhus, to whomsoever has the itch, or boils, or a
discharge, or scabs, the use of an itch-cloth".

"According to the 90th Pakittiya such cloth must not be more than four spans in length and two in breadth."

I can not help quoting from Mohāvāgga,⁵ another discourse of Buddha as it shows clearly the surgical treatment of boils in ancient times:—

Now at that time a certain Bhikkhu had boils.

"I allow, O Bhikkhus, the use of the lancet".

Decoctions of astringent herbs were required.

"I allow, O Bhikkhus, decoctions of astringent herbs".

Sesamum salve was required.

ततस्मिनं भजनदामः स्थाति समुक्ति । उपसपन्यमोद्देन विषणस्थानयद्दिताः ॥

Suśruta Samhitä, I. xxxiv.

मर्गोधलक् कपायेण लीधकल्कं तथा पियेत्। बाखावे चीमपदं वा भावितं तेऽनुधारयेत्॥

Caraka Samhitä, VI. xxx.

² Mahāvāgga. VIII. 17, 2.

^{*} Ibid. VI. 14, 4 & 5.

"I allow, O Bhikkhus, the use of sesamum salve".

5. Compresses were required.

"I allow, O Bhikkhus, the use of compresses."

It was necessary to tie up the sore with cloth.

"I allow, O Bhikkhus, the use of bandages for tieing up wounds".

The sore itched.

"I allow you, O Bhikkhus, the sprinkling of a sore with mustard-powder".

The sore became moist.

"I allow you, Bhikkhus, to fumigate (the sore)."

Proud flesh formed on the wound.

"I allow you, O Bhikkhus, to cut off (proud flesh) with a lancet".

The wound would not close up.

"I allow, O Bhikkhus, the use of oil for wounds".

The oil ran over.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of fine rags, and of all kinds of ways of treating wounds".

If the object of fumigating the sore was to sterilize it, as it certainly was, we may take this dialogue as the best sketch of the scientific treatment of boils,— remembering that it represents the knowledge of surgery more than 2500 years ago.

Cakrapāṇi advises us to tie the ends of the hairs of a patient, by a piece of cloth, before performing phlebotomy on the vessels of the head and neck.

मद्पश्चिक्षानी जानुखापितकपैरः।

4. CARMA OR LEATHER.

The use of leather in ancient medical practice in India was manifold.

Leather bandage.

Straps or belts of leather were used as bandages. Susruta¹ advises us to apply the leather bandage in cases where more than half the thickness of the upper or lower extremities are cut by some sharp instruments in a slanting direction. Then the parts of the wound should be well adjusted, the bone and the soft parts kept in apposition, and the wound closed by sutures and well covered by dressings, over which the leather bandage is to be applied in the form of a gophanā or sling.

Leather bandage in the form of gophanā is mentioned by Suśruta² to be applied over the anus to prevent recurrence of procidentia of the rectum. The prolapsed bowl should be well bathed with ghee and fomented; and then reduced by gentle pressure. There should be a hole in the bandage just in front of the anus to allow flatus to pass out. Vṛnda³ alludes to it. Similarly the modern surgeons use a pad supported by a bandage as an aid in

Suśruta Samhita, IV. xx.

गृदसंधि गृदं सेहैरम्बन्धाः य प्रवेशयित्। प्रविष्टं स्वेदियशिप वदं गी:फणया स्थान् ॥ गी:फणयिति । गी:फणा वस्तविशेष:। तकं हि:—त्ववारनिर्गनाय मिक्किट्रे स उर्मणा चास्त्र गी:फणावस्य: कार्थ इति ॥

Vrndamādhava or Sidhhayoga, Ch. 57.

¹ See foot-note 1, P. 178.

गृदसंगी गृदं स्तिन्नं स्त्रीसामा प्रत्रेशयित्।
 कारयेदगीफंगावसं सध्यक्तिद्रेस चर्माणाः।

preventing descent of the gut. It is mentioned also in the Cakradatta and the Yogaratnākara.2

Drdhavala mentions the use of a piece of untanned leather to be applied over a layer of ointment during the day, while during the night the leaf of Eranda (Ricinus communis) is directed to be used.⁵

LEATHER LIGATURES.

In the treatment of snake-bite, a ligature is advised to be used above the seat of injury to stop the circulation of poisoned blood. This ligature is advised to be made of leather, or braided fibres of trees, or soft cord of jute, etc.⁴

YANTRA-ŚĀŢAKA. LITHOTOMY STRAP OR BINDING APPARATUS.

This is the name of the leather shackle, which is recommended to be used during the operation for stone in the bladder. The patient should flex his knees and elbows; and the parts are to be

- े गुदर्भंत्रे गुदं स्निष्ठिरमानाऽऽय प्रवेशयोत्। प्रविष्टे स्वेदयेशापि वद्यं गी:फ्याया हृद्म्॥ Cakradatta, Ksudraroga Cikitas.
- गृदधंशि गुदं स्तिम्नं स्वेत्रेनाक प्रवेशयेत्।
 प्रविष्टं रोधयेदयबाद्रव्यसच्चिद्र चर्मना ॥

Yogaratnākara, P. 343.

- े एरखपते: प्रच्छाय राती कलां विमोचयेत्॥ चीराम्ब्या तत: सिक्तं पुनवैवोपनाहितम्। मुखेदाती दिवावदं चर्माभिय सुलोनभि:॥ १४। Caraka Samhitā, VI. xxviii.
- सब्बेरेवादितः सपैः शास्तादष्टस्य देखिनः ।
 दंशस्तीपरि वधीयादरिष्टायतुराङ्ग्ते ॥
 श्रीतवर्षान-वन्तानां सद्नावतसेन च ।
 न गच्छति विधं देशसरिष्टासिनिवारितं ॥

tied together by this instrument. Similarly, it is to be used during the operation for piles; but then, according to Suśruta, the neck and thighs are to be tied by the instrument which is to be held firmly by the assistants. Vägbhaṭa³ uses cloth instead of leather.

Yantra-sāṭaka is also to be used during the operation of phlebotomy. Suśruta says⁴: "If venesection is required to be done, the patient is to be seated on a stool, an aratni high (from the elbow to the end of the little finger), facing towards the sun. The thighs are to be flexed, the two elbows to be placed over the knees, and the hands (the fingers being clenched into fists) to be fixed on the two sides of the neck. The two ends of the shackle which pass over the fists, are held up at his back by the left hand of an assistant, who with his right hand steadily (neither forcibly nor loosely) presses above the part selected, to make the veins prominent, and at the same time rubs on the back to

Suśruta Samhitā, IV. vii.

Ibid, IV. vi.

षय यनेष वाससा।

सक्यो विरोधरायाच परिविष्ठ सनुस्थितम् ॥

Aşţānga Hrdaya Samhitā, IV. viii.

* तत स्वजिति पुर्षं प्रवादित्यसुखनरिवसाचीकित उपवेखासने सक्योराक्वितयी-निवेख कूपरसन्धिवयसीपरि इसावनस्र्वाहुङकतस्त्री सन्वयी: खापिवला यनस्याटकं सौवासुक्षीक्परि परिविधान्वेन पुर्वेण प्रवात्धितेन वानदक्षेनोत्तानेन साटकानदं याद्विला तती वैद्यो व्याद्विषद्भनेन सिरोत्यापनार्थे नात्यावतिप्रवितं यनस्विष्टयेत्यसक्सावसायं यसं प्रवन्ये च पोद्विति कर्षपुरुषे वाद्युणेनुश्चं स्वाद्येदेव उत्तमाङ्गतानामनस्युख-वर्षानां सिरासां स्वयेन यनस्वविधि:।

सङ्चितजानुकप्रिनितरेच सहाववत् स्वेच गाठकैवा।

^{*} वस्त्रकम्बलकोपविष्टं यन्त्रशाटकेन परिचित्र यीवासकदंपरिकर्विभि: सुपरिग्रहोत-सम्बन्दनगरीरं क्रवा।

stimulate bleeding, the patient being then told to inflate his mouth with air forcibly. This is the method of binding for puncturing the veins of the head except those (veins) which have their mouths turned inside the body". Vāgbhaṭa describes a similar procedure in bleeding from the vessels of the neck¹.

The Greeks also used ligatures to tie up the arms and legs of a patient in the lithotomy position. Paul² says: "In operating, the woman should be placed on a seat in a supine posture, having her legs drawn up to the belly, and her thighs seperated from one another. Let the arms likewise be brought down to her legs and secured by proper ligatures about the neck".

In modern times, similarly, we use lithotomy straps or crutch, after placing the patient in the lithotomy position during the operation of lithotomy and excision of piles.

Pāśa.

This is a different shackle to be used for binding insane persons.³

Snéruta Samhita, VI. lxxii.

[े] चित्रतापातपश्चिम्भी जानूबासन संस्थित: । सदुपशतकेशानी जानुस्थापित कूपेर: ॥ सृष्टिम्यां बस्त्र गर्भाभ्यां सन्ते गाड़ निपीड्येत् ॥ Astanga Hrdaya Samhita, I. xxvii.

^{*} Paul. VI. lexiii.

भीमाकारेगरेनांगेदांनेत्यां तेय निर्व्विषे: ॥
 भीषयेत् मततं पात्रे: क्यामिव्वाय ताइयेत् ।
 यव्ययत्वा सुष्ठां वा चासयेत् व्यायिता ।

ABDOMINAL BINDER.

The use of cloth binder has been described before¹. Leather binder is to be used after the operation of paracentesis abdominis to apply pressure over the abdomen. After draining the fluid of ascites, the abdomen of the patient should be well wrapped with blankets, or silk cloth, or leather binder, for then the abdomen would not be flatulently distended by air.²

LEATHER BAGS.

The use of leather in the formation of bags of the vastiyantra has been described before³.

STRO-VASTI. LEATHER BAG FOR THE HEAD.

For application of oil on the head, Suśruta⁴ directs us to use a goat's bladder filled with medicated oil, just in the same way as ice bags are used nowadays.

Śārngadhara⁵ describes another variety of śīro-vasti: "It is

Suáruta Samhitä, IV. ziv.

Ibid, VI. xviii.

श्रिरोविसिविधियात्र श्रोक्षते सृत्रसम्बतः।
 श्रिरोविसिवर्ष्ययः स्वितस्वो धादमाङ्गलः॥
 श्रिरःप्रमाणं तं वडा सम्मने मापिष्टकः।
 सिवरोधिनिधायादी सेहै: कोणोः प्रपूरयेत्॥
 तावत् धार्यस्त यावत् स्वातासानेत्रसुखस् तिः।
 वेदनोपयमो वापि सावार्षा वा सङ्खलस्॥

Śārngadhara Samgraha, III. zi.

¹ See P. 181.

नि:स्तेच दोषे गादतरमाविक काश्य चर्म्यशमकातमेन परिवेष्टयेदृदरं तथा नाथापयित
 बाद्धः ॥

^a See P. 129-30.

^{*} सञ्चासीनस वधीयाद वशिकोषं तती हदै।

made of leather, has a length of twelve anguli and has two orifices or mouths. The leather bag is to be well tied round the head, the junction of the circumference of the bag and the skin should be well pasted with māṣa (Phaseolus Rox) glue. Then the cavity thus formed is to be filled with hot oily medicine. This is to be retained until the headache is relieved." Cakradatta also mentions it. The bag is described to be sixteen anguli high in the Yogaratnākara. Vāgbhaṭa advises us to use leather of a cow or buffalo, and it is said to have been twelve anguli broad.

LEATHER BAND.

In phlebotomy, a band is advised to be applied above the spot where the vein is to be punctured. This band is recommended to be made of cloth, or jute, or leather, or barks of

- माशिरो व्यायतं चर्च कलाष्टाङ्क्सुक्टितम् ॥
 तेनाविका शिरोऽधसान्त्राधकक्किन विपयत् ।
 नियक्कीपविष्टस्य तेलेक्चै: प्रपूर्यत् ॥
 Cakradatta, Siro-roga Cikitsä.
- चारिरी वापितचर्च घोक्याङ्गलस्कितम्।
 तेनावेळ प्रिरोऽचलात्यायकल्कैन लीपवित्॥

Yogaratnākara, P. 402.

विधित्तस्य निषयस्य पीठे जानुसमे सदौ । प्रदात्रस्तिप्रदेशस्य दिनाने गव्यमाध्यम् ॥ दादशाङ्गलविसीयं चन्त्रेपष्टं प्रिष्ट सम्म् । पाक्यं वन्त्रन स्थानं ललाटे वस्त वेटिते । चेलवियाक्या वद्या मावककोन लेपयेत् ॥ ततो ययाव्याधि प्रतं खेदं कोणं निषचयेत् । स्रतं क्रिम्यो यावद्याङ्गलं धारयेव तम् ॥

Astange Hrdaya Semhitä, I. zzii.

trees, or tendrils of twining plants¹; and it should not be applied either too tight or too loose. As for example, in phlebotomy in the foot, the yantra-śāṭaka or ligature should be applied below the knee-joint, while the band is to be tied round, at a distance of four anguli above the part selected for the operation.³ Vāgbhaṭa³ says: "In phlebotomy, a band is to be tied round the upper extremity, four anguli above the spot selected for opening the vein which is to be made prominent by pressing it upwards with the closed fist." Cakradatta⁴ also quotes it. Vāgbhaṭa⁵ recommends us to use a cloth band to be tied round the leg, four anguli above the spot selected for opening the vein in the leg.

This band corresponds to the band of Antyllus used by the Greeks. Antyllus applies a ligature of two fingers'

³ गार्व वडीपरि डढ़ं राज्या पहेन वा समम्।

Aştānga Hrdaya Samhitā, I. xxvi.

वस्तपश्चक्यांन्तव्वेदक्षजलतानामन्यतमेन यन्त्रयिता नातिगादं नातिश्रिष्टिलं श्रीर प्रदेशमासाध्य यथोक्तं गस्त्रं गरहीत्वा सिरां विध्येत् ॥

Sufruta Samhitā, III. viii.

" तच पादव्यध्यसिरस्य पादं समिस्याने सुस्थिरं स्थापयित्वानां पादमीयत्सङ्खितसुर्वेः कत्वा व्यध्यपादं जानुसन्धेरघः शाटकेनाविष्य इसाधां प्रपौदा गुल्फं व्यध्यप्रदशस्योपिर चतुरङ्गलम् ब्रोतदौनामन्यतमेन वडां पादासिरां विध्येत् ॥

Ibid.

किञ्जेतस्त्रिमां वाहावनाकुधित कूपेरे। वहा सुखोपविष्टस्य सुष्टिसङ्गुष्ठ गर्भिनीस्। कडे विश्यपदिशास बहिकां चतुरङ्खे॥

Aştanga Hrdaya Samhita, I. xxvii.

Cakradatta, Šīra-vvādhādhikāra.

पार्ट तु सुस्थितेऽधसाचानु सम्बेनियौदित । गार्ट कराभामागुन्दं चरने तस्य चौपरि ॥ दितौये कुखिते किखिदाद्दे इसवसतः । वहा विध्येर् सिरामित्यमनुक्षेत्रपि कस्ययेत्॥

Astanga Hrdaya Samhita, I. zzvii.

breadth round the arm in bleeding at the elbow, while to bleed at the ankle, the band is to be applied at the knee. It is mentioned as fillet in the pseudo-Hippocratic treatise on Ulcers; and Oribasius gives an interesting dissertation on the subject, principally condensed from the works of Herodotus, Antyllus and Galen. Paul also ties a narrow band round some muscular part of the arm before abstracting blood from the inner part of the elbow. "Wherefore we must tie a narrow band around some muscular part of the arm, and having by friction of the hands upon one another produced the necessary fulness of the vein, we divide it transversely, but only along its breadth."

LEATHER BOTTLES, JARS, MASAKA, etc.

Leather was used in the manufacture of bottles and jars. Leather masaka for honey, Soma juice, and dadhi (curdled milk), is mentioned in the Rgveda⁴ and also in the Laws of Manu where

Rgveda, 6 M. 48 S. 4 A. 8 Ch. 18 v.

यो इ वां सधुनो हतिराहितो रवचवैचे। ततः पिवतमधिना॥

Ibid, 8 M. 5 S. 5 A. 8 Ch. 19 v.

चिक्कष्टं चम्बोभेर सोमं प्रवित मा स्त्र । नि प्रेडि गोर्डा लिचि ॥

Ibid, 1 M. 28 S. 1 A. 2 Ch. 9 v.

एव सीमी अधि लचि नवां कौड़वदिभि:। इन्द्रं मदाय जोड़वत्॥

Thid, 9 M. 66 S. 7 A. 2 Ch. 29 v.

¹ Ulcers, iii. 328.

^{*} Med. Collect., vii, Phlebotomy.

Paulus Ægineta, Adam's Trans, Bk. VI. Sec. XL.

इतेरिव तेऽवकमस्य स्थ्यं ।
 चिकटस्य दधनतः सपूर्यस्य दधनतः ॥

swimming bladders, and we have a representation of "figures with garlands in their hands, swimming and disporting themselves, supported on masaks or inflated skins." In the Rgveda, Agastya in his spell to neutralise poison, says: "I deposit the poison in the solar orb, like a leather bottle in the house of a vendor of spirits." Dr. Mitra points out that "other smrtis ordain that oleaginous articles preserved in leather bottles do not become impure by the contact of the impure cowhide; and in the present day, jars of that material are in extensive use in Bengal and the North-West Provinces for the storage of oil and ghee. In the latter place, leather bags are universally used for raising water from wells, and

स्वति भीमो व्यमसविष्यया महे शियानो हरिणी विचचण:।
भा योनि सोम: सुक्रतं नि वीदित गव्ययो लग्भवति निर्णिगव्ययौ ॥
Regreda, 9 M. 70 S. 7 A. 2 Ch. 7 v.

एव स भानुकदिवति युज्यते रथ: परिज्ञा दिनो पस्य सानवि। एचासो चिवान्ययुना चिव चयो इतिसूरीयो मधुनो वि रप्यते॥ Ibid, 4 M. 45 S. 3 A. 7 Ch. 1 r.

Wa - L D - L TI 00

See Wilson's Rgveda, II. 28.

' इन्द्रियाचां तु सर्वेषां यदोकं चरतीन्द्रियम्। ततीऽस्म चरति प्रचा हते: पादादिनोदकम्॥

Manu Samhita, II. 99.

"But when one among all his organs fails, by that single failure his knowledge of God passes away, as water flows through one hole in a leathern bottle,"

Ibid, Jones' Translation.

- * Pl. xxxi. fig. 1. Fergusson's Tree and Serpent Worship, P. 127.
- " स्व विषमा संजामि इति मुरावती रहे।

Rgveda, 1 M, 191 S, 2 A, 5 Ch. 10 v.

. Ihid. Wilson's Translation

according to the law books of Śańkha and Likhita,¹ that water is declared pure which is kept in old leather bottles"². To this may be contrasted the prevailing Hindu notion that water is defiled if touched by a Brāhmana in his shoes. Though the leather is not allowed to be a material of dress of the Hindus, except his shoes which are considered as unclean, leather belts formed one of the eight sacred utensils necessary for a śramaṇa of the Buddhist order; and in the Manu Saṁhitā³ we find the students of theology advised to "wear for their mantles, the hides of black antelopes, of common deer, or of goats."⁴

5. ANTARVALKALA. THE INNER BARKS OF TREES.

Barks of trees are recommended to be used as splints for the support of fractured bones. In fractures of bones of the foot, leg and thigh, Susruta directs us to use splints made of barks of trees⁵ to surround the limbs. In the treatment of a simple fracture, Bhāva Miśra advises us to use cold water first, then mud is to be applied, and lastly the fractured bones should be secured

भागो ६पवदमस्वत्यः परिग्रद जीर्षचर्यकारस्वकेवस्युक्ताः ।
 चर्यकारस्वः चर्यपुटः ।

Sankha and Likhita.

- Dr. R. C. Mitra's Indo-Aryans, vol. II.
- कार्चरीरववासानि चर्माख बद्धचारिचः।
 वसीरब्रानुपूर्वेण शायाचीमाविकानि च॥

Manu Samhita, 11. 41.

- · Ibid, Sir Wm. Jones' Translation, II. 41,
- अभाज्य सर्पियापादं तलभवं कुगोत्तरं ।
 वस्त्रपट्टेन वधीयाज्ञच व्यायाममाचरित् ॥

by splints and bandages. In the Yogaratnākara, we are advised to treat fractures, by lowering the raised end and elevating the depressed end of the bone, and then by using splints and bandages to keep them in position. Bhāva Miśra, describes it similarly after Suśruta. Suśruta directs us to use barks of Vata (Ficus Indica. Rox.) and bamboo strips as splints to support the neck after reducing its dislocation by holding at the temporo-maxillary articulations on the sides and the occipital protuberance on the back, and raising him up in the air. He should lie down with his head raised for seven days. In modern times, the Sayre's suspension apparatus and jury mast serve the same purpose.

The barks of Madhuka (Bassia latifolia); Asvattha (Ficus religiosus), Kukubha (Terminalia arjuna); Poläsa (Butea frondosa; Rox.); Udumbara (Ficus glomerata; Rox.); bamboo; sala (Shorea robusta), Vata (Ficus Indica Rox.); are mentioned as

पहेनालिपनं क्यांत्रथनं च क्त्रश्नान्ततम्।
 चवनामितसुद्रास्थोदृद्रतं 'चावपौद्रयेत् ॥
 चित्रं तिधापि च स्थाने संस्थाय्य विधिमाचरेत् ॥

Yogaratnakara, P. 345.

भवनामितसुद्रश्चे दुद्रतथावपीङ्येत् ।
 भाग्वे दितिचिप्तमधोगतखोपरि व सँयेत् ॥

Suśruta Samhitā, IV. iii. Bhāva Prakāša, II. iii. Bhagnādhikāra.

भवटावयहत्वीय प्रस्तोत्रस्येत्ररं।
 तया कुणान् ससंदत्ता वस्तपट्टीन विटयेत्।
 छत्तानं शायये वैनं सहरावसतिन्तः॥

[े] बादी भग्न' बिदिता तु सेचयेच्हीतलाम्बुना । पहनालेपनहार्यः वसनस् कुणानितम् ॥ Bhāya Prakāša, H. iii. Bhagnādhikāra.

supplying the materials of splints. Bhāva Miśra adds Kadamba (Anthocephalus cadamba), Hijjala (Barringtonia acutangula), Sarjja (Pinus longifolia) to the list. Such splints are called kuśa, and Vāgbhaṭa says that the splints should be broad, thin, pliant and clean.

Dr. Jacobi, of Dublin, says that he has seen an excellent splint made from the "fresh bark of a tree, taken off while the sap is rising". "It fits admirably", says he, "just like paste-board soaked in water". Dr. C. C. Jewet recommends for the same purpose the bark of leriodendron, or tulip tree.

THE CRUTCHES.

The crutches were used to help the crippled. In the Vajaseniya Samhitā of the White Yayurveda, there is a passage describing the different kinds of human victims, appropriated to particular gods and godesses. The passage occurs also in the Taittirīya Brāhmana with slight differences. There we

Suśruta Samhitä, IV. iii.

- मध्कोदुस्वराष्ट्रस कदम्ब निचुलत्वचः । वंश्वसर्ज्ञां जुनानाच जुनार्थमुपसंस्टेन् ॥
 Bhāva Prakāša, TL iii, Bhagnādhikāra.
- कदम्बोदुम्बरागत्मकार्ज्यंन पलायतः।
 वंशोद्ववे वा प्रयुक्ति सनुक्तिः सुनिविधितः॥
 सुद्रव्याः सुप्रतिसम्भे वैक्कलेः शकलेरपि।
 सुद्राह्मयः समं वर्षा पद्मसोपिर बोजयेत्॥

Astānsa Hydaya Samhitā, VI. xxvii.

मध्कोडुन्द्रावल पलाश कक्रमलयः।
 वंशसञ्ज्यवटानां वा कुशार्धमुपसंहरित्॥

^{*} Hamilton's Fractures and Dislocations. 5th Ed. P. 50-51,

[&]quot;Fhe 20th Mass. vols.

find "to the two (deities) who preside over the gains above or below one's expectation (utkula and vikula), a cripple, who can not move even with the help of a crutch" is recommended to be sacrificed. And again "to the divinity of land, a cripple who moves about on a crutch."

The use of the sound limb as a splint of support for the fractured bone of the opposite side was well known. Wooden splints resembling in shape the injured member are also recommended. Suśruta says² that if the hand be fractured, it is to be tied with the opposite hand, but in fractures of both the hands, Gayadāssa³ recommends a wooden hand to be used as a splint for both. After union of the fractured bones, the hands should be made to hold balls of cow-dung, mud and stones.

6. LATA OR CREEPERS (TENDRILS OF).

The tendrils of creepers as materials of ligature are mentioned

उल्कुलविकुलाम्बां (उल्कुलविकुलिम्बः) विस्थिनं । सुखे पौठसपिनसालसते ।

Taittiriya Brühmana.

Quoted in Mitra's Indo-Aryans. vol. II. P. 84-85.

उमें तले समें कला तलभग्रस देहिन:। बग्नीयादामतेलेन परिषेकच कारयेत्। प्राग् गोमयमयं पिष्ठं धारयेन् स्वायं तत:। इसे जातवलीचाप क्यांत पाष्ट्रं

Suśruta Samhitā, IV. iii.

अधोतु उमेऽपि इसातले तवेकस भड़े वामे दिख्यान दिख्या वामेन, उभयोस्तमङ्गेन तस्त्रमेन, काष्ठमयेन क्रत्या इ अपि वधीयादेवं दार्थः भवतीति, सत्पिखादिधारयामात्रमक्ष्ये प्राप्तार्थम् । by Susruta. He recommends¹ to give up a patient, bit by a snake, as hopeless when he does not respond to the application of stimuli, such as cold water, tendrils of creepers, etc. Vägbhaṭa² advises us to introduce the stalk of the lotus, with a thread tied to it, inside the throat to extract any foreign body stuck there. When the soft stalk is touched by the salya, it should be extracted by the sudden withdrawal of the stalk and thread.

7. VASTRA OR CLOTH.

Cloth⁵ as a material of bandages, tents, gauze, etc. has been described before ⁴.

8. ASTHĪLASMA. STONE OR PEBBLE.

It is a piece of stone—long and round. It is advised to be used for moving arrows fixed in the bone⁵. Caraka⁶ advises us to strike two pieces of stone against each other to resuscitate a

> अजीर्थ पित्तातप पोड़ितपु वालप्रमेहेष्वय गर्भिनीपु। इडातुर चौथात्रमुचितपु रुचेषु भीरुष्य दृहि नेपु॥ शस्त्रचते यस्य न रक्तमित राज्योलताभिय न सम्पदित। शौताभिराद्विय न रोम हर्षो विषाभिसूतं परिवर्ज्ञयेतं॥

> > Suśruta Samhitā, V. iii.

कच्छसीतीगति शस्य सूच कच्छे प्रवेशयेत्।
 विसेनाचे ततः शस्य विसं सूवं समं इरेत्॥

Aştānga Hrdaya Samhitā, I. xxviii.

- वस्त्रं प्रसिद्ध त्लक म्वनिर्मितं वैद्यनार्थं प्रयुक्तते ॥
 Vägbhatärtha Kaumudi, I. xxv.
- · Sec P. 176-83.
- च्यामप्रसारखकः शस्त्रपीड्नावं निर्धातनाच युन्धते ॥

Ibid.

अग्रमनी: संघटनं कर्णयामुंखे श्रोतोदकेनीचोदकेन वा सुखपरिषेक:।

Caraka Samhitä, IV. viii.

still-born child. In bleeding from the veins of the neck, Vagbhaṭa¹ advises the patient to hold firmly two pieces of stones in their hands.

A piece of stone is to be used by a person, for holding it with his hand, after recovery from fractures of the carpal and metatarsal bones².

In ancient times, in India, the kings used to decorate themselves with antidotary gems, as a safeguard against poisons.³ Even now the snake charmers apply a black stone on their bodies where they are wounded by the venomous reptile. This stone is popularly known as the vi-a-pāthara or poison-stone, and is supposed to have the property of extracting poison from the body.

9. MUDGARA, HAMMER.

Susruta directs us to use a hammer or a piece of stone to strike an arrow firmly fixed in the bone, until loosened, when it can be conveniently extracted by means of a pair of forceps⁴. It should be pointed out that the tubular instrument—salva

Aşţānga Hrdaya Samhitā, I. xxvii.

Kämandakīya Nītisāra, Ch. vii. v. 10.

रचिती गडुरोझार मसियंस्य विमूषणं। स्यावरं जङ्गमं तस्य विषं निर्व्वापितां बजेत्॥

भाषायगर्भद्दसास्य जानुष्ये प्रसते भूजे। ज्ञचेरारम्य सदिते विश्वेदङ्गोर्दपारकः॥

^{*} See foot-note, 2, P. 196.

विषक्षेत्रदक्के सातो विषक्षमण्डिम्थितः ।
 परीचितं समग्रीयागाङ्गलाविद्यस्व तः ॥

^{*} अस्तिदेशो तुष्टित महीलासमुद्वरायामन्यतमस्य प्रहारेया विचाल्य यथामार्गमेव। Suárutā Samhitā, I. xxvii.

nirghātanī—described before¹, served the same purpose. Vāgbhaṭa also uses a hammer² to shake an arrow fixed in the bone, and directs us to extract it with the hands or by the various kinds of forceps³.

The Greeks used some iron instrument to shake such an arrow from the place where it was lodged. The hammer was also used by the Greeks and Romans but in a different capacity. Paul mentions its use in cranial surgery to strike the lenticular and gouge⁴. Paul and Celsus describe a "method of extracting foreign bodies from the ear by laying the patient on a board and striking the under side with a mallet." Vägbhata describes this method for draining out water from the ear.⁶

10. PANIPADATADA. THE PALM OF HAND AND SOLE OF POOT.

11. ANGULI OR FINGERS.

The surgeon's hand is considered by Susruta to be the principal instrument as the use of all other instruments depends

Ibid.

See P. 111.

[&]quot; मुद्गराहतवा नाद्या निर्घात्योशुस्त्रितं हरेत्। तैरेव चानयेन्द्रार्थमार्गीसुस्त्रितं तु यत्॥ Astānga Hrdaya Samhitā, I. xxviii.

क्याहरेत् करमायः करवेदेतरत् पुनः।
 हयः सिंहाहिमकरवर्तिः कर्कटकाननेः॥
 कद्वयः वर्षसंस्थानादः यहीतः शकते यतः।
 कद्व सङ्गङ करर शरारी वायसाननेः॥

[·] Paultis Ægineta VH. xc.

Milne, Graceo-Roman Surgical Instruments, p. 125.

[े] कर्षेत्रम् पूर्णे इसीन मधिला तेलवारिणी। चिपेदधीमुखं कर्षे इनावा चुप्रयेत वा॥ Aşţānga Hṛdaya Samhitā, I. xxviii.

upon it¹. But again he mentions the hand and foot as accessory to, or substitutes for, the instruments. Longmore² says: "Of all instruments for making a complete examination of a gun-shot wound as well as for exploring for foreign bodies which may be lodged in it, the finger of the surgeon is the most appropriate, whenever a wound is large enough to admit of its insertion." There are many instances of the use of hand and foot in the treatment of surgical diseases but I shall point out a few of them.

1. Both Suśruta³ and Cakradatta⁴ say that "if a swelling be hard but slightly painful, then it should be well fomented, pressed and rubbed by a piece of bamboo, or palm of the hand, or thumb to cause its subsidence. Bhāva Miśra also quotes this verse ⁵. Suśruta ⁶ and Vägbhaṭa ⁷ recommend a similar treatment for enlarged glands.

Suiruta Samhita, IV. i.

अथव्य स्वेद्यिता च वेखनाबाततः शनै:।
 विस्वापनार्थं सङ्गीयात् तलिनाङ्गुष्ठकेन वा ॥

Cakradatta, Vranasotha Cikitsa.

अभ्यञ्च केदयिलातु विस्ताबा ग्रनै: ग्रनै: ।
 विमर्देयेडियङ्गन्दनास्त्रीनाङ्गुष्ठकेन वा ।।

Bhāva Prakāša, II. iii.

इतिषु दोषिषु यद्यानुपूर्वं यसी भिषक् श्रेष समुख्यितेतु ।
 सिश्चस्य विस्तापनमेव कृष्यादङ्गुङलोडोपलवेल् दृढ्छै: ॥

Suśruta Samhitä, IV. zviii.

ं संस्वेदा वड्गोयन्तिं विसदीयात् पुनः पुनः।

Aştanga Hrdaya Samhita, VI. xxx.

See foot note, P. 90.

Longmore, Gan-shot Injuries, 1877, P. 319.

अध्यक्ष सेद्यिता तु वेखना वा गनै: गनै:। विसद्यीविषक् प्राप्तमालीनाङ्ग्यकन वा॥

2. Suśruta says¹ that "when a morsel of food sticks in the throat, a blow should be fearlessly struck with the fist on the shoulder of the patient without his knowledge": Vāgbhaṭa² also describes it.

It is however curious to find that exactly the same procedure was adopted by Alsaharavius. Adams in his commentary³ on Paul says that "when a morsel of food sticks to the cesophagus, Alsaharavius directs that the person should be struck on the back, which will facilitate the descent of it".

3. In the reduction of dislocation of the lower jaw, Caraka used his fingers to do it exactly in the same way as recommended by the modern surgeons. He directs us to depress the lower jaw by the thumbs and at the same time to raise the chin by the index fingers. The verses are quoted by Cakradatta. The description of the method, quoted from any modern text book, would be a good commentary on the above passage of Caraka. Erichsen says. "The reduction is best effected, by the surgeon,

Aştānga Hrdaya Samhitā, I. xxviii.

Caraka Samhitā, VI. xxviii.

[े] यासमञ्ज्ञीत कल्डासको नि:शहमन बुहस्कर्स सृष्टिनाभिङ्गात् सेहं सर्व पानीयम् वा पायचित्। Suáruta Samhitä, L. xxvii.

चपान कत्थघाताभ्यां यामणस्य प्रवेणयेत्।

³ Adam's Commentary on Paulus Ægineta, VI. xxxii.

व्यात्तानने इनुं खिनमङ्गुष्टाध्यां प्रपीय च ।
 प्रदिजिनीध्याचीतस्य चित्रकोत्तमनं हितं ॥
 सक्तां सङ्गयित् स्वानं सत्यां खिद्रं विनामयित् ।
 प्रत्येकं स्वानट्षादिकिया वैजेष्णमाचरेत् ॥

Cakradatta, Vätabyädhi Cikitsä.

Surgery, Vol. II, p. 658.

standing before the patient, placing his thumbs, well protected by napkins, or a few turns of a narrow bandage, on the molar teeth on each side, and then depressing the angles of the jaw forcibly, at the same time that he raises the chin by means of his fingers spread out and placed underneath it."

4. Caraka says¹: "After pairing her nails and covering the tip of her index finger with cotton, the nurse is to clean the palate, lips and throat of the new-born child".

With this passage we may compare what Barnes says on the point². "The attendant having then placed the child close to the mother, so as to avoid any strain on the cord, should cleanse its mouth from any fluids, such as blood and mucus, it may have partially swallowed during its passage through the vagina. This should be done at once, as such fluids drawn into the lung vescicles may give rise to inflammation of the lungs, or even septicemia."

5. Suśruta³ recognises "six modes of diagonosing diseases, namely by the five senses i.e. by hearing, smell, taste, sight and touch, and by questions. "Symptoms descernible by the sense of touch are coolness or heat, smoothess or roughness, softness or hardness, and other tangible qualities of the skin in fever, dropsy,

Caraka Samhitä, IV. viii.

[े] भयास्य तालोडकण्ड जिडाप्रमार्ज्यं नेमारमेत भड्डल्यास्परिलिखितनख्या सुप्रचालिती-प्रधानकार्पासपित्रमत्या प्रयमं प्रमार्ज्यितस्यास्य च शिरसालु कार्पासपितुना सेडगर्मेन प्रति-स्वादयेत्।

Obstetric Medicine and Surgery, Vol. II, p. 105.

विक्षित्रे हि रोगाणां विकानोपाय:। तदाया पचिम श्रोवादिभि: प्रश्लेन चिति।
 क क क्यमनिद्धियविभेया: श्रोतोणक्रचा कर्कश्रसद्कितनतादयो ज्वरमोकादियु।

and other diseases." And we know how important it is to educate the tactile sense in the diagonosis of diseases.

6. The foot is recommended to fix a part of the human body whence any foreign body may be removed easily by the hands.¹ Suśruta says²: "If a foreign body cannot be easily extracted, as when it is impacted in the hollow or the substance of a hone, the part should be pressed by the feet, and it should by drawn out by the instrument." Vāgbhaṭa also gives a similar description³. Caraka describes a method of removal of the placenta if not spontaneously seperated. One of the female attendants should press upon the navel of the peurpera foreibly with her right hand, while with the left hand placed upon her back, she should shake her. Then the heel is to be placed on the patient's buttock while the two sides of the gluteal regions are also to be pressed and shaken⁴.

12. JIHVA OR TONGUE.

The organ of taste as a means of diagonosis is noted by

- पाद इति पार्टन शरीरदेशं भ्रता इसादियन्तेण चडरणादि कियते। Vägbhaṭārtha Kaumudī, I, xxv.
- अस्तिविवरप्रविष्ट' अस्तिविद्यः' वाऽवरस्य पादाभ्यो यने वापहरेत् । Sufrata Samhitä, I. xxvii.
- अस्विद्वष्टं नरं पद्म्यां पौड्यिता विनिर्हरेत्। इत्यमको मुवलिभिः मुरहोतस्य किडनैः॥

Aştanga Hrdaya Samhita, I. xxviii.

 तस्त्राय दमरा न प्रपन्ना स्वादयैनामन्यतमा स्त्री दिख्येन पायिना नाभेकपरिशादलवत्
 निपौदा सन्येन पायिना प्रत्रत उपसंख्या सुनिर्द्तं निर्द्तुयात्। क्षवास्ताः पादपार्ध्या-श्रीकौमाकोटयेदस्याः स्मिचात्रपसंख्या सुपौदितं पौदयेत्।

Caraka Samhita, Y. vii

Suśruta¹. "Symptoms discernible by the sense of taste are the various tastes noticeable in morbid secretions of urine and other diseases". Cakrapāṇi "explains that 'inference' is necessary, because the sense of taste can not be exercised by the physician on the patient directly;"² he must do it through some intermediate agents such as ants, whose attraction to sugar is well-known and so the presence of sugar in urinary diseases can be inferred."

13. DANTA OR TOOTH.

Ivory as a material of surgical instruments has been described before³. Suśruta⁴ advises us to use the ash of ivory with stibium as a stimulant to the growth of hair on a scar. It is also recommended by Vāgbhaṭa⁵.

14. NAKHA OR NAILS.

Suśruta advises the surgeon to use his nails⁶ for the operation of cutting, piercing and extraction, if these can be possibly helped by his nails.

In modern times, nails often help the surgeons in separating

Suśruta Samhitā, IV. i.

Aşţānga Hrdaya Samhitā, VI. xxiv.

[।] रसनेन्द्रिविजेयाः प्रमेहादिषु रसविजेयाः।

Aşţānga Hrdaya Samhitā, I. x.

^{*} Hœrnle's Commentary on the Suśruta Samhitä, I. x. (Bibliotheca Indica).

^{*} See page 67.

इसीदनामसी कवा मुख्यक्षेत्र रसाञ्चनं।
 रोमाखेतिन जायने निपान् पानितलेखिया॥

तैलाका इलिदलस्य मधी वा चौषधं परम ॥

भाहार्यक्वेदामेदोषु नखं शक्येषु योजयेत ।

layers of tissues during operation as in the operation for the radical cure of hydrocele. We often extract thorns, impacted in our body, with our nails.

15. MUKHA OR MOUTH.

The use of mouth as a suction apparatus was well known to the ancients. Suśruta advises us to use ārā or pāṇimantha (awl) to perforate bone in diseases of the medullary canal, caused by obstructed and deranged air. He next introduces one end of a tube, open at both ends, into the canal through the perforation in the bone, while through the other end the surgeon sucks out air by his mouth. The use of mouth for sucking out air through the śṛṅga or horn has been described before. Caraka says that the poison of a snake-bite may be sucked out by the surgeon's mouth, filled with flour or ash. Even in modern times, it is common amongst Indians to suck out blood, in accidental cuts by knives, by the mouth. The practice of the suckers in Europe has been noted before.

16. VALA OR HAIR.

Horse-hair is to be used for applying ligatures round the piles⁵. It is also a material of suture for the skin. Horse-hair is also described to have been used for raising pterygium. Paul⁶ also used horse-hair to raise a pterygium.

Suśruta Samhitä, IV. iv.

³ निकडेऽस्थिन वा वाथी पाणिमन्थेन:दारिते। नाडौँ दत्तास्थिनि भिषक् चुषयेत् पवनं वली॥

⁵ See P. 148-49.

³ दंशं वा च्येन्स्खेन यवच्यंपांशपूर्वेन।

Caraka Samhitā, VI. xxv.

See P. 149-50.

[े] वाला:, अवादीनां प्रकारकेशा दक्षेशाय अर्थो वाल्यादि वन्यनायं युज्यते । Vägbhatartha Kaumudi, I. xxv.

^{*} Paulus Ægineta, VI. xviii.

Suśruta¹ says: "Bundles of hairs or tents are to be used in the treatment of wounds in the skull, formed by the extraction of an arrow from the brain. These would prevent the hernial protrusion of the cerebral subtances from passing out through the wound. The hairs are to be removed one by one, as the wound heals up gradually." Vāgbhaṭa² also approves this treatment.

A bundle of hairs tied to a long thread is mentioned by Suśruta to have been used for the extraction of fish-bones from the throat³. The patient is directed to swallow the ball of hairs with some liquid. Next emetics are to be administered to excite vomiting. During this act, the foreign body gets entangled in the meshes of the ball, which being then suddenly pulled out by the thread outside, extracts the fish-bone satisfactorily. Vägbhata⁴ also describes it similarly. For this purpose

शिरसीऽपङ्गते शब्धे वालविर्णं प्रवेशयित् ।
 वालवर्ष्णांमदत्तयां मम्तुलुङ्गं त्रणात् सर्वत्॥

Suśruta Samhitā, IV. ii.

कार्य्या मल्याहते वित्ते भङ्गादिदलिते किया। भिरसीपहते मल्ये वालवित्तं प्रवेशयेत्॥ मस्तुकस्तते कुढो इत्यादेनं चलीऽत्यदा। असे रोइति चैकैकं मनेरपनयेत् कचम्। मस्तुकुङसुतीः खादिव्यक्तिकानव्यजीवजान्॥

Aşţānga Hrdaya Samhitā, VI. xxvi.

ै पित्रज्यमन्यदा तिर्ध्यक्त क्षासक्त सर्वेचा कैशोक्ष्यकं हट्डेक स्तवतं द्रवसकोपिहर्ते प्ययदाकच्छाच पूर्वकोष्ठं वासयेदस्तय मज्ये कदेशसक्तं ज्ञाला सूर्व सहसा लाखिपेत्। Sufruta Sanhitā, I. xxvii.

कोजोन्दुक्षेत्र पीतेत द्रवै: कन्टकमाचिपेत्।
 सहसा मुचवतेत वसत क्षेत्र चैतरत्॥

Aştānga Hrdaya Samhitā, I. xxviii.

a tooth brush formed by chewing the end of a narrow branch of a tree is also recommended. A common domestic remedy is to make the patients swallow large morsels of boiled rice, plantain, etc.

Paul* mentions a similar contrivance, and says: "Some are of opinion that the patient ought to be made to swallow large morsels, such as stalk of lettuces or pieces of bread; but others direct us to bind a thread about a small piece of clean soft sponge and give it to the patient to swallow, and then taking hold of the thread to draw it up, and to do this frequently in order that the thorn may get fixed in the sponge and be brought up". For this purpose Aetius used the epilation forceps. Paul calls it acanthobolus or the fish-bone forceps.

The modern surgeons use a probang for the same object. "Small sharp bodies, such as bristles, fish-bones, or pins, are generally found sticking between the pillars of the fauces and the tonsils." Such bodies "should not be pushed on, but an endeavour should be made to catch them with the "horse-hair probang." This being pushed gently, unexpanded, beyond the point where the pin or bone is stuck, is expanded by pulling up the handle and then withdrawn with a slight rotatory motion."

Caraka4 mentions the practice amongst the recently delivered

[े] सदुना वा दन्तधावनकु भैकीनापहरेत्।

Suśruta Samhita, I, xxvii.

Paulus Ægineta, VI. xxxi.

³ Swain's Surgical Emergencies, 3rd ed., Pp. 32-33.

^{*} चयासा वालवेग्या कग्ठतालु परिस्त्रोत्।

women to push a braid of her hair into her throat, to help the expulsion of the placenta. So in the Yogaratnākara¹, her throat is advised to be rubbed by a finger surrounded by hairs. This practice is still prevalent among the women of Bengal to a certain extent.

SUTURE MATERIAL.

Horse-hair was the material used by the Hindus for sutures. Besides it, they used 2 sutures of fine thread, or the fibres of the bark of Asmantaka (Casalpina digynia), or threads made of hemp or flax, or of the fibres of which bow-strings were made, or of the fibres of the Mūrvvā (Sansevieria zeylanica) or Gudūcī (Tinspora cordifolia). Besides these, the Hindu surgeons used the mouth parts of the ants as clasps to close incisions on the intestines. Susruta 3 describes the use of living black ants to close the incisions on the walls of the intestines, during the operation for intestinal obstruction, after removing the scyballi, stones, etc. He advises us to remove the bodies of the ants, leaving their heads fixed on the margins of the incision,

Yogaratnākara, P. 437.

Suáruta Samhita, I. xxv.

साया म्लेच वत्कले:।

सीयेन दूर नासने यहानात्यं न वा वह ॥

Aştānga Hrdaya Samhitā, I. xxix.

Suśruta Samhitä, IV. xiv.

¹ केमवेटित्याङ्गला तस्ताः कराः प्रधर्मयेत्।

सीव्येत् म्फोण स्वेण बल्केनारमनाकस्य वा ।
 सनजचीमस्वाभां साया वालीन वा प्रनः ॥
 सुव्यागृङ्चीतानेवां ।

[ै] परिसाविद्यायेवमेव शंकासुबृत्यानासावान् संशोध्य तिष्वद्रमन्तं समाधाय क्रण-पिपौलिकाभिर्देशयेत् दष्टे च तासां कायानपहरित्र सिरांसि ततः पूर्ववत् सीखेत्।

in the act of biting. Then the intestines should be replaced with the ants' heads sticking to them. Caraka¹ also describes the use of ants for obliteration of small perforations in the intestines, but he takes away the ants before replacing the gut into the abdominal cavity. If by any accident, the abdominal muscles be incised and the intestines come out of a gaping wound, Suśruta recommends us to allow black ants to bite the exposed coils of intestines before replacing them into the abdomen². This is a curious practice of ancient surgery of the Hindus. The Greeks and Arabs never mentioned it. "Amongst some Indian tribes, it is customary to allow both edges of a wound to be seized by the sharp head-nippers of certain ants, whose bodies are then rapidly cut off; one ant after another being used, the wound is closed."

Susruta describes four sorts of sutures, viz:

- 1. Vellitaka or winding.
- 2. Gophanikā or like a sling.
- 3. Tunna sevanī or continued sutures.
- 4. Rjugranthi or interrupted sutures.
 - किंद्राख्यक्त तु स्यूलैदेशियला पिपीलिकी: । वहशः संस्कीतानि मला च्चिला पिपीलिकान् । प्रतिसीगै: प्रवेखाकां विहः सीस्येद अर्था ततः ॥

Caraka Samhitä, VI. xviii.

श्रीमद्रमन्तं निष्कुम्तं प्रवेश्वं नान्यद्या भवेत्। पिपौलिकाशिरोयनं तदाष्यं के वदन्ति तु।। प्रचाल्य प्रथमा दिन्धं त्रवाशीचित पांशिमः। प्रवेश्यत् क्रचनखी एतेनाक्तं श्रनैः श्रने:।।

Suśruta Samhitā, IV. ii.

³ Neuburger's History of Medicine. Playfair's Translation, Vol. I., P. 9

These are advised to be so applied as they may suit the different parts of the body¹. The needles must not be introduced either too far from, or too close to the edges of the wound. In the former case, the lips of the wound shall be inflamed and so cause pain, while in the latter, the sutures will give way".

The use of horse-hair as a material for suturing wounds was unknown to the Greeks and Romans. They used sutures of flax and woollen threads for wounds. Paul says: "Afterwards we unite the seperated parts with a needle containing a woollen thread, being satisfied with two sutures." Celsus advises us to use sutures of soft thread; and the apolinose of Hippocrates is directed to be made of crude flax.

17. AŚVAKATAKA. THE RING OF A HORSE'S BRIDLE.

Susruta says that when the arrow is firmly fixed in the bone and if it can not be extracted by forcible pulling by hands or instruments, it should be tied to the ring of a horse's bridle. Then the animal is to be whipped, when by the sudden movement of the horse, the weapon would be jerked out of the wound⁵.

18. ŚĀKHĀ OR BRANCH OF A TREE.

Another method is to tie such an arrow by means of a rope

सीव्येदेक्षितकं शनै:। सीव्येद्रोफिणिकां वापि सीव्येदा तुन्नुमेदनीं। सनुयन्त्रिमयो वापि यथायोगमयापि वा॥

Suśruta Samhitā, I. xxv.

³ Paulus Ægineta, VI. xii. Adam's Translations.

Celsus, V. xxvi.

Hippocrates, iii. 132.

अवन्त्रकटके वा वधीयादयैनं कथ्या ताङ्येदाशीन्नयन् थिरोदेशेन शल्यमुखरित । Sufruta Samhitā, L. xxvii.

to the branch of a tree, lowered by pressure¹. When the pressure is released, the branch suddenly goes high up, and thereby it pulls the weapon out of the wound². Dallana, however, mentions another view that a bridle-ring and a branch of a tree are both required for the extraction of foreign bodies³. Hærnle remarks: "The branch apparently is put through the ring to afford a stronger pull"⁴. Vägbhaṭa⁵ also mentions these contrivances.

19. STHTVANA OR SPITTLE.

Dallana⁶ understands by it—" throwing out expectoration and saliva by the mouth." By this means any foreign body lodged in the oral cavity, such as in the gums, fauces, may easily be got rid of.

Sušruta Samhitā, I. xxvii.

ै शाखा, उच्चशाखा, वहाधास विनिन्ताधां शाखायां शब्दायभागं हदं वदा, सहसा शाखाब्दागिन उच्चित्तया शाख्या शब्दमुभियते । Vägbhatärtha Kaumudī, I. xxv.

ै अन्ये लेवं पठिन अशकामीवं वा वलविहः सुपरिग्टहितस्य यन्ते पैनं याद्यविता श्रव्य-सावडं प्रविभूज्य धनुगुँ नैव्वेडेकतः शायाचवककटके वधीयात्। अथैनम् इत्यच कारकेक पाठः कश्या ताइयेत् यथोत्रमयन् शिरोवेगेन श्रव्यसुदेरति, निमतायां पञ्चाह्यां इच्छाखायां व पूर्व्वद बहोडरिदिति॥

Nivandha Sangraha, I. xxvii.

- The Suśruta Samhitä, Bibliotheca Indica, P. 48, foot note 109.
 - तथायशको वारङं वजीलत्य धनुकाया। सुवढं वजकटके वधीयात् सुसमाहितः॥ सुसंयतस्य पश्चाङ्या वाजिनः कशायय तम्। ताङ्येदिति सूर्वानं वीनोज्ञमयन् यथा॥ चढरिक्ष्ण्यमिवं वा शास्त्रायां कत्ययेत्तरोः।

Aşţābga Hrdaya Samhitā, I. xxviii.

छीवणं श्रेषादिनिरसनम्।

Nivandha Samgraha, I, vii.

३ इट्रां वा इच्छाखामवनस्य तासां पूर्ववदवदीद्वरित्।

20. PROVAHANA OR PLUXING THE PATIENT.

This comprises the acts of emesis, purgation and lacrymal secretion. Thus the foreign bodies lodged in the alimentary canal or eyes may be got rid of by causing discharges from the bowels, the stomach, or the eyes¹.

21. Harşa or objects exciting happiness.

Persons suffering from vraṇa or wound are directed to have their minds in a state of cheerfulness by the sight of objects exciting happiness². A cheerful man is a better subject for a surgical operation than a morose and gloomy one. Vāgbhaṭa³ adds fear as an accessory instrument. Joy and fear cause a sudden change in the temper of a man and so may be of some help in curing diseases⁴. Suśruta regards, sorrow as a śalya or foreign body which is to be removed by joy.⁵

22. AYAŞKĀNTA OR LOAD-STONE.

Magnet was known to the ancient Hindus6 and they used it

सङ्दो विचिपन्याय क्याभित्रं वदेदनाः।
 वाचासयन्तो वङ्गलनुक्लाः प्रियम्बदाः॥

सन्पदायत् कृषानि: कयानि: प्रीतिनानम:। षाणावान् व्याधिनीचाय चिप्र' सुखनवाप्र्यात्॥ Sukruta Samhitā, I. xix.

- ³ See foot-note 1, P. 98.
- * भय हपी शरीरस्य सहसा भावानारस्त्यादयनी यनकार्यं कुरुत इति । Vägbhaṭārtha Kaumudī, I. xxv.
- इदावस्थित मनेक कारणीत्पद्रं गोकशल्यं इपॅबीति।

Sufruta Sambită, I. xxvii.

मियाममं स्थाभसपंयमहष्टकारयकं।

Vaiseşikā Daršanam, Ch. V. Āhnika 15.

त्वायुचनपूडार कास सूत पूरीपानिली: स्त्रभावनलप्रकृते नयनादिन्य: पति । Suáruta Sāmhitā, I. xxvii.

to extract minute foreign bodies such as iron particles from the eyes and teeth. Suśruta¹ also mentions its use for extracting an arrow from the wound, if it be without barbs.

In modern times, a magnet is still used for removing a particle of iron from the eye. "Indeed, cases have occurred in which the application of an inch bar-magnet connected with four Grove's cells to the outside of the cornea has caused the foreign body to retrace its course and emerge through the wound". A fragment of iron lying in the vitreous has been removed by the Snell's electro-magnet introduced through the scleral wound behind the ciliary region. "The following plan of ascertaining whether a portion of needle be really impacted has been suggested by Marshall, and successfully carried into practice by Littlewood of Leeds. A powerful magnet is to be held upon the part for a quarter of an hour, so as to magnetise the fragment; a firmly hung polarised needle should then be suspended over it, when, if any iron is present, deflection will ensue."

23. Kṣāra. Caustics or potential cautery.

Caustics were highly extolled by the ancient surgeons as the external applications are better tolerated by the weak and

स्यभिसपंयमिति स्वीपर्दन सीइमातं हयाबीपलचयतिः तथा चायस्तानाभिसुखं यत् स्यादेगमनं

Śańkara Miśra, Upaskāra.

Suśruta Samhitä, I. xxvii.

भनुलोममनववद्ववर्धमनल्य व्यसुखनयस्तान्तन ।

² Carter's Ophthalmic Surgery, 2nd ed., P. 369.

² Erichsen's Surgery, Vol. I, P. 343.

timid persons who are afraid of the surgeon's knife¹; though Suśruta² distinctly states: "The following persons should not be treated with caustics: weak people, children, old and timid people, etc." They even give them preference to the knife for they argue that surgical diseases are radically cured by the application of the caustics, without any possibility of recurrence. Suśruta says³: "Of all cutting instruments and their substitutes, caustics (or vegetable alkalis) are the most important, because by means of them deep and superficial incisions and scarifications may be made, derangements of the three humours may be rectified and some diseases can be treated with special advantage."

For the preparation and uses of caustics, see the Suśruta Samhitā, I. xi.

For the application of potential cauteries, three classes of instruments are recommended.⁵

 Darvvi—it is to be made of wood and should resemble a spoon in appearance.

> भव्यसत्वेऽवले वाले पाके चातव्यं मुद्दते । दारगं मन्द्रं मन्द्रादिस्तिते चान्यत पाटनं ॥

> > Aşţānga Hrdaya Samhitā, I. xxix.

श्रमनिते चारक्रवा: । तदाया दुर्वलवाल स्वविर भीरुमव्याङ ग्रनीदरि रक्तपिति-गाभिन्गुतुमती प्रवदन्तरि प्रमिहोर: चतचीनद्यचा मृच्हाँपदृतक्षीवापवत्तीवृत्त फलयोनय: ॥

Suśruta Samhitā, I. xi.

- े म्ह्यानुमस्त्रेश्वः चारः प्रधानतमन्त्रेयमेयलेख्य करणातिदीयप्रशादिशेषकियावचारणाच । Sufruta Sanhitā, I. xi.
- * Ibid. Hoernle's Trans. Bibliothica Indica.
- चाखाय च दब्बींक्च शलाकानामन्यतमेन चारं पातयेत ।

- 2. Śalākā or rods,—plain probes are mentioned for application of caustic lotions to parts of the body. But generally the ends of the probes are shaped like spoon. To this class belongs the three spoon-like probes of Suśruta and the three nail-shaped probes of Vāgbhaṭa, described before¹.
 - 3. Kūreca,—it is a brush-like instrument.

The application of caustics has its advantages and disadvantages; and these are to be considered in their relations to the pre-amesthetic periods of surgery. Patients are still less terrified by their application than by surgical incisions. The real value of caustics is thus summed up by Velpeau.2 "Nevertheless caustics possess some advantages which can not be denied them. As they do not give the idea of an operation, they shake less the minds of the patients, they are accepted with more calmness and with infinitely less effort, than the action of the knife. Mortifying the tissues step by step, they give rise to no effusion of blood, and affect less deeply the economy than the operation, properly so called. Women treated in this way do not require to remain in bed or to consider themselves as patients. The dressings require little care, and do not demand absolutely the intervention of the surgeon. The wound cleans itself very rapidly in general, and once cleaned, it proceeds speedily towards cicatrisation. Without exempting wholly erysipelas, phlebites or purulent infection as some surgeons have asserted, there is notwithstanding, some reason for supposing that they expose the patient somewhat less to these troublesome complications than the operation".

¹ See P. 158-159.

² Velpeau. Cancer of the breast. Marsden's trans.

25. AGNI. ACTUAL CAUTERY.

Suśruta says1: "With regard to surgical treatment, actual cautery is said to be superior to caustics, in as much as diseases treated with the actual cautery do not re-appear, and because it can cure diseases which are incurable by medicines instruments, and caustics."2 This partiality for cauteries is one of the reasons of the gradual decadence of Hindu surgery and its total extinction in the present time. To this belief of the Hindus may be compared the following aphorism of Hippocrates3:-

"Those diseases which medicine do not cure, the knife cures; those which iron can not cure, fire cures; and those which fire can not cure, are to be reckoned wholly incurable".

For the application of the actual cautery the following articles are considered necessary4:-

- 1. Pippali or piper longum
- 2. Goat's dung
- 3. Teeth of a cow
- 4. Sara or saccharum sara
- Probes or śalākā (see before⁵)

These are to be used for diseases of the skin.

चारादग्रिगैरीयान् क्रियास् व्याख्यातसङ्खानां रोगानांमपुर्वभावाद्वित्रग्रम्बचारैरसाध्यानां तत्साध्यताच । Suiruta Samhita, I. xii,

³ Ibid. Hoernle's Trans. Biblio, Ind.

³ The Works of Hippocrates, Syd. Soc., vol. II., p. 774.

^{*} अधिमानि दहनोपकरणानि । तदावा पिपल्यजाग्रहोदन ग्ररम्लाका जासवीहेतर लीहा: चौद्रगृड्सेहाय। तत पिथल्यजाशक्षद्वोदन शरशलाकास्वग्यतानां। जाम्बवीह तर-लोहानि मांसगतानां चीद्रगृदखेहाः सिरसायु स्थास्त्रगतानां ।

Suśruta Samhitā, I. xii.

¹ See P. 159-60.

- 6. Jāmvavaustha¹
- 7. Different kinds of iron

Used for diseases of the muscles.

- 8. Honey²
- 9. Treacle
- 10. Ghee
- 11. Oil

Used for diseases of the vessels, joints and ligaments.

"Both Actius and Oribasius represent goat's dung, pounded with vinegar, as being equally efficacious as the sinapism, and applying particularly to ischiatic diseases." Hippocrates says that cauterisation may be performed with boxwood spindles dipped in boiling oil. In Kordofan, are used "El kamaia. primitive instruments used for cauterisation consisting of a piece of camel's or sheep's dung dried and impaled on a long thorn."

12. Cautery knife.—This is to be used in the treatment of prolapse of the omentum in cases of abdominal injuries. The

> अर्थो भगन्दरयस्त्रिनाड़ीदृष्टत्रवादिषु । मांसदाडी मधुखेड जास्वतीष्ट गुडादिभि: ॥

> > Aştanga Hrdaya Samhita, I. xxx.

मधुन्दिप्टेन तैलीन मजाचौद्रवसाहतै:। तप्तेवा विविधेली हैं देवहाइ विभेषवित ॥

Caraka Samhitä, VI. xiii.

- 3 Adams' Commentary on Paul. vol. iii, bk. vii, sec. xix.
- . Hippocrates, ii. 482.

^{*} Medical Practices in Kordonfan, Third Report. Wellcome Research Laboratory, Khartoum.

prolapsed part is to be ligatured well and the cautery knife used to remove the prolapse below the ligature.

Cautery knife was also known to the Greeks and Romans. Galen², speaking of cancer, says that "some use heated razor blades, at once cutting and burning". Paul³ also mentions a sword shaped cautery in the radical cure of hydrocele.

13. Plates of copper, lead or iron.—In the application of both kinds of cauteries, plates of these metals are to be used to surround a tumour to prevent injury to the adjacent structures (Susruta).⁴

Hippocrates⁵ in the treatment of nasal polypus, says that "when that occurs we must insert a tube and cauterise with three or four irons". Celsus⁶ says that this tube may be a calamus or a tube of pottery.

14. Cakradatta mentions a probe of gold for applying actual cautery to the hair follicles after the removal of the eyelashes, to prevent a recurrence of trichiasis.

Albucasis similarly recommends burning the roots of hairs

उदरान्मेदसो विभि निगता यस दिहन: । कथायभवासन्त्रीणां वहा स्तेण स्ववित् । अग्रितरेन अस्त्रेणिकन्यानाध्समायतं ॥

Suśruta Smithitä, IV. ii.

Suśruta Samhitā, IV. xiii.

¹ Galen, xiv. 786.

Paul, vi. lxii.

यदल्यमूलं वपुताससीस पर्शः समावेष्टा तदायसैन्ता ।
 चाराग्रियस्त्राच्य सक्तद्विद्धात् प्राणानिस्तिम् भिष्यप्रमणः ॥

⁵ Hippocrates, ii. 244,

[&]quot; Celsus, vii. x.

See foot-note 2, p. 66.

in trichiasis with a probe of gold. Paul¹ applies a heated olivary probe or an aural probe for the same purpose. Haly Abbas and Rhazes also describe this operation.

26. BHESAJA OR MEDICINES.

This means such medicines as become necessary in the treatment of surgical diseases and do the work of surgical instruments to a certain extent. Susruta gives a list of medicines,2 required in the treatment of various kinds of inflammations, and I quote a few passages from the English translation³ to illustrate the action of medicines in surgical practice. "Warm poultices made of the following drugs promote suppuration, namely, fruits of sana (Crotalaria juncea), Múlaka (Raphanus sativus), Sigru (Moringa pterygosperma), seasum and mustard seeds, flour of barley and wheat, kinva (the drugs used as a ferment in distilling spirits) and linseed. The following medicines are applied for opening abscesses, namely, chiravilva (Pongamia glabra), agnika (Semicarpus anacardium), chitraka (Plumbago Zeylanica), danti (Baliopermum montanum), hayamaraka (Nerium odorum), and the excrement of the pigeon, vulture and heron. Caustic alkalies are also very offectual in opening abscesses. Demulcent articles, such as, flour of barley, wheat or masha (pulse of Phaseolus Rux.) promote discharge from the interior of abscesses. * * * * Pastils for fumigating ulcers should be made of sriveshtatka gum of (Boswellia Thurifera), sarjarasa (resin of Shorea robusta), sarala (Pinus longifolia), and devadáru (Cedrus

¹ Paul viii. xiii.

^{*} See Suśruta Samhita, I. xxxvi.

Dr. U. C. Dutt's Translation, Bibliotheca Indica. P. 151-154.

deodara); decoctions or cold infusions of astringent and unirritating barks should be used as washes for promoting granulations in ulcer. Tents for promoting granulations should be made of soma (Sarcostemna brevistigma), amrita (Cocculus cordifolias), ašvagandhá (Withania somnifera), the plants included under the class of kákolyádi, and the buds of (Ficus Bengalensis)".

In treating inflammation, the Hindu surgeons used pastes to give relief to the pain and tension; warm poultices to promote suppuration; medicinal applications and incisions by knife for opening abscesses; demulcent articles to promote discharges; decoctions of drugs as corrective washes; tents of drugs and lints for introducing them into the cavities of the abscesses; decoctions in oils and clarified butter to improve the character of ulcers; pastils for fumigating sores; tents, pastes, powders and lotions for promoting granulations; drugs to repress high granulations; drainage to prevent infection, and bandages to give the part rest. This shows that the Hindus were not wholly ignorant of the antiseptic methods of treating wounds; and Susruta enjoins that a certain incense should be kept burning in the operation room.

Of the additions to the list of Suśruta by Vägbhaţa, we need consider the goat's gut only.

GOAT'S GUT.

The intestines of the goats, etc. are to be dried and prepared as materials of ligature. They should be used in ligaturing fine vessels after incision by knife, evidently to check hæmorrhage.

See foot note 1, P. 223.

The use of goat's gut in surgery is generally considered to have been unknown to the Greeks and Romans, as it is not mentioned in their works. But Adams points out! "that the strings of ancient harp were made of the guts of a sheep," and this he clearly proves from a passage in the Odyssey of Homer.

Hippocrates² used apolinose made of crude flax, which is also mentioned by Paul for the delegation of arteries. Rhases however describes the use of strings of harp³ as a material for suture in the operation called gastroraphé.

ARREST OF HEMORRHAGE.

It is generally believed and often stated in modern works on surgery that the ancients were unacquainted with the proper treatment of hæmorrhage. Susruta however enumerates four different ways of arresting hæmorrhage after venesection; namely:

- Sandhāna: —Contraction of the wound by astringent decoctions of Chebulic Myrobolan and the rootbarks of the panchavalkala trees (five barks).
- Skandana:—or thickening of the blood by the application of severe cold.
- Pāchana:—or descicating or drying up the wound by ashes.
- Dahana:—or cauterising the veius to make them shrink⁴.

See Commentary on Paul, VI. lif. vol. II, P. 345. Syd. Soc. Ed.

Hippocrates, iii. 132.

² Rhases, Cont. xxviii.

चतुन्तिधं यदंतिह रुधिरस्य निवारणं।
 सन्धानं सन्दन्धेव पाचनं दक्षनं तथा।

If the blood does not thicken by the application of cold, astringents should be applied; if these fail ashes should be used. By means of these three modes, the physician should endeavour to the best of his abilities to stop the bleeding, but if success be not still obtained, cautery may be resorted to as the absolute effective means. To stop bleeding from an artery, he advises us to apply astringents and pressure with the fingers. Vagbhata also describes these methods of arresting hamorrhage, and advises us that if the ordinary means do not check the bleeding, the vessel must be again opened at a point in its course beyond the bleeding area, or actual cautery applied. Cakradatta also repeats these directions.

. Vägbhaṭa however mentions the sheep's gut amongst the accessory instruments. His commentator explains its use for

त्रयाः कषायः सन्धते रक्तं स्वन्दयने हिनं। तथा सन्याचयेत्रस्य दाहः सदीचर्यन् सिराः॥

Suśruta Sachhita, I. xiv.

भक्तन्द्रमाने क्विरे सम्भागानि प्रयोजवित्। सम्भाने सम्प्रमानि तु पाचतेः समुप्रचारित्॥ कल्केरतैकिमिर्वेदाः प्रयतित यथाविधि। असिडिमत्मु चैतेषु दाषः परम इष्यते॥

Thid.

श्रेत लितिष्ठति चिप्रं साध्यनीमाचरित् कियान्। लीप्रं प्रियङ्गं पणङ्गं मापयन्याङ गोरिकैः॥ स्तकपालाञ्चनचीम मधी चीरीत्मङ्गेः। वित्रुचैयेद अधसुखं पद्मकादि छिमं पिवेत्॥ तासेव वा यिरां विध्येद्यधात् तथादनलरं। यिरासुखं वा लिरतं दहेत् ततमलाकया॥

Aştanga Hrdaya Samhita, I. xxvii.

^{*} See Cakradatta, Siravyadhadhikara.

ligaturing blood-vessels¹. Susruta says that if in venesection, or in treating wounds, excessive bleeding occurs, it should be stopped by proper means².

Celsus³ advises us to fill up the wound with dry pledgets, then to apply a sponge squeezed out of cold water and to press with the hand. If not successful, cut the vessel asunder between two ligatures, or apply cautery, or try the method of revulsion. Galen⁴ applies pressure by finger on the wounded vessel, or twists it moderately. If the vessel be an artery, he gives the alternative of a ligature or cutting across. Paul⁵ mentions all the methods to stop the bleeding, viz., pressure, styptics, ligature, escharstics, and cauteries with fire.

Albucasis mentions four methods of stopping the discharge of blood from an artery:

- 1. By cautery.
- 2. By dividing the artery across.
- 3. By using the ligature.
- 4. By styptics and bandage.

Avicenna7, Rhases8 and others also mention these methods

वेलेबिमिनैवेष्ट्रधा शीनित प्रसृते सर्थ ।
 कार्य यवीक वैदोन शीनितस्थापन भवेत् ॥

Suśruta Samhita, IV. i.

- 3 Colsus, v. 26.
- . Galen, Meth, Med. v.
- Paulus Ægineta, IV. lii. vol. II. P. 127. Syd. Soc. Ed.
- Albucasis, Chirrug, i, 58,
- * Avicenne Cantic. ii. 2., and Collig. vii. 23.
- Rhases, Divis i. 39; Contin. raviii,

चर्न भेषादीना ग्रष्वान तादन्यातं मन्त्रच्छदाननरं म्यासिरादिवश्वनादिषु युज्यते ।
 Vägbhatärtha Kaumudi, I. xxv.

for arresting hæmorrhage. Thus it becomes apparent that the use of ligature for stopping bleeding was well known to the ancient surgeons and the present methods of arresting bleeding are only the revival of the old practice. Adams¹ concludes: "It appears, therefore, that the use of the ligature for stopping hemorrhages was well understood by the ancients, and had never been lost sight of even in the darkest ages."

Adam's Commentary on Paul, vol. II. p. 132.

CHAPTER VI.

THE SASTRA OR THE SHARP INSTRUMENTS.

1. THE MANDALAGRA OR ROUND HEADED KNIFE.

It is described as a round or circular headed cutting instrument, having a length of six anguli. Two sub-varieties are noted —one with a circular edge and the other shaped like a razor (Dallana). Vägbhaṭa², however, describes the blade to be shaped like the index finger when its nail points towards the palm of the hand. This would then resemble the decapitating hook of Ramsbotham.

It is said to have been principally used for the operation of cutting through and scraping³; so it is recommended to be used

> म्ब्डलमिंवार यस तत् गब्डालार तम दिविधम् तथाहि— यदये मब्डलं हत्तं चर संस्थानमेव वा। मब्डलायस्य जानीयात् प्रमाणन्तु यङ्ग्रुलम्। Nivandha Samgraha, viii.

मखलावं फलि तेषां तजन्मनाम्बाङ्गति।
 लेखने केंद्रने योज्यं पीविको प्रस्थिकरदिव॥

Aşţānga Hrdaya Samhitā, I. xxvi.

मखलायं, मखलायं नाम शस्त्रं, फलें, फल प्रदेशे, तजैन्यनर्गखाति स्वात्, धनः, धनाईतो नखः, धनार्गखः, तर्व्यन्य धनार्गखः तर्व्यन्यनर्गखः, तस्त्रेवात्ति राकारो यस्य तत् तर्व्यन्यनर्गखाति। तथ पोथकौ गलग्रस्थिकादिष्, निखने, निखन कथंथि, तथा देदने, देदन कथंथि, योज्यं।

Vägbhaţārtha Kaumudī, I. xxvi.

फलोड्रेशे तर्जना बनानेखसर्जन्यनानेखसस्त्रेवाज्ञतिर्येख तद्देवम् । Sarvänga Sundari, I. xxvi.

Suáruta Samhitā, I. viii.

[ै] तव मन्डलायकरपवे स्थातां केंद्रने लेखने च।

in the operative treatment of enlarged tonsil¹. It is also advised to be used for piercing the skull of a dead fœtus in utero to help its easy extraction by other instruments. So any other presenting part causing difficulty in the delivery of the dead fœtus, is to be cut with it. It is claimed that there is less likelihood of damaging the soft parts of the mother by this instrument than by the sharp pointed vyddhipatra.²

We find that Suśruta recommends a mandalägra knife in ophthalmic practice for scraping away the membranous expansion in the operation of pterygium³ and other ophthalmic operations,

> भङ्ग हाङ्ग तिसन्द शैनाकष्य गलग्रन्तिकां। ईदियेन्त्रख्यलाये च जिङ्गोपरि तु संस्थिताम्। नीत्कष्टचेव चीनच विभागं च्हेदियेज्ञिषक्॥

Suśruta Samhitä, IV. xxii.

शत्र खियमात्राम्य मञ्जलाये चाहुली यस्त्रेच वा शिरो विदार्थ शिरः कपालामाहत्य गढुना गर्डीलोरिंग कवायां व्यवहरेदिनिवागरिंग चाविक्टे गच्छे वा चंससंसकस्यां सदिशे वाडं किला डितिनिवाततं वातपूर्णोदरं वा विदार्थ निरस्यालाचि गिविलीमृत माडरिज्यचनसक्तस्य वा अधनकपालानीति ।

यद, यदक्व 'हि गर्भमा तमा सजति तहिष्क् । सम्यम्बिनिहरिक्किता रचित्रारीख यततः । गर्भमा गत्यिया जायनेऽनिलकोपतः । तवानास्मतिब्बयो वर्षेत विधिपूर्वतं ॥ नीपेचित स्तं गर्भ मृहक्तं मिप पिछतः । सद्यायः जननीं हिन निरुक्कांसं परा यया ॥ मन्छलाये च कर्षे व्यामनार्विजानता । हिन्नम् हि तीचार्यः नारीं हिस्सात् कदाचन ।

Ibid, IV. xv.

असं यत वलीजातं तत तहागयद भिषक् ॥ अपाइं प्रेचमाचस्य विद्यान समाहितः । सुनुख्यास्ट्रस्य मेथावी म्चीस्त्रेण वा पुनः ॥ नचीत्वापयता चिप्रं कार्यमभ्य वृतं तु तत् । such as for vascular net-work and nodules on the eyeball¹. Cakradatta says² that if the pterygium extends to the black part of the eye, the membrane is to be raised by the point of a needle, transfixed by a vadiša or hook, and leaving the pupil free, is to be excised, as Sivadāsa³ explains, by the mandalāgra. He also uses it to scrape away the root of any new growth in the eye⁴ and to perform the operation of scratching in ophthalmic surgery⁵.

शस्त्रपातभयाचास्य वक्ष नी याद्ययेद हदं॥
ततः प्रशिविलीभृतं विभिनेव विलस्ति ।
उत्तिखन्मग्रजायेणः तीच्चो न परिशोधयेर्॥
विसुक्तं सर्वेतयापि क्षणाच्युक्ताच मण्डलात्।
नीता कनीनकोपानं विन्यादाति कनीनकं॥
चतुर्भागस्थिते सांसे नाचि व्यपत्तिसर्वति।

Suśruta Samhitā, VI. xv.

मिराजाल सिरायास्त कठिनासाय द्वासमान्। उत्तिखेन्यकलायेच विज्ञीनावलस्थितः॥ सिरास पिङ्काजाता या न सिध्यन्ति भेषजैः। अर्थवन्यकलायेच तासाळेडनस्थिते॥

Ibid.

चर्म तु च्छेदनीयं स्नात् क्रचाप्रातं भवेद्यदा।
 विक्यविवस्त्रमय विभागस्त्रात वर्ज्यति॥

Cakradatta, Netraroga Cikitsa.

* चर्चाकेदनीयमिति मक्कलायेणेति श्रेष:। समुद्रस्थेति म्व्ययेणेति श्रेष:। म्व्ययेण समुद्रस्य उत्तील्य चननरं बढ़िशेन विश्वा मक्कलायेण केदयेदित्वयं:।

Tattva Candrika, Netraroga Cikitsa.

* प्रश्नेसचावका नाचा याकार्थोऽर्व्दमिव च। सच्छलाये च तीच्यो च मूलेच्छिन्दाद भिषक् श्रनै:॥ Cakradatta, Netraroga Cikitañ.

अभिलोपनाइं कफजं पिपाली मध्सैन्यते:।
विलिसिन्यन्यलायेच प्रक्तियहा समन्ततः॥

A small instrument with a broad blade and a rounded cutting tip is figured by Albucasis1 in connection with ophthalmic work. This was the scalpel for the plastic operation on the evelid as for trichiasis. Incisions were made by this knife on the evelids in such a way as to enclose a leaf-shaped area which was then dissected off. The lips of the incisions were then united with three or four sutures2. Paul3, quoting Actius4. describes the operation for pterygia :- "Having separated the eyelids, and seized upon the pterygia with a hooklike instrument, having a small curvature, we stretch it, and taking a needle having a horse-hair and a strong flaxen thread in its ear (eye?), and a little bent at the extremity, we transfix it through the middle of the pterygium, and with the thread we bind the pterygium and raise it upwards, while with the hair we separate and saw as it were the part at the pupil away unto its extremity; but the remainder of it at the great canthus we cut off from the base with the scalpel used for the operation by suture, but leaving the natural flesh of the canthus, lest there be a running of the eye when it is taken away. Some stretching as aforesaid with a thread, dissect away the whole pterygium with the instrument called pterygotomos, taking care not to touch the corner."

Cakradatta mentions the use of the mandalagra for scarifying

इतसैश्वव चूर्णेन कफानाई पुन: पुन:। विलिखिनाम्हलायेण प्रच्छवेदा समन्तत:॥

Cakradatta, Netraroga Cikitsā.

Milne. Graco-Roman Surgical Instruments, Pl. ix. fig. 3.

Paulus Ægineta, VI. viii.

³ Ibid, VI. xviii.

^{*} Actius, II, iii, 60.

the tongue for bleeding in the disease called jihvākantaka (priekly tongue)¹. He also uses it in adhijihvā or ranula and says: "The tongue is to be raised, the ranula is to be drawn up and fixed by a sharp hook, and then excised by the mandalāgra. Afterwards a strong gargle is to be prescribed".² Pālakāpya³ also describes it to have a length of nine anguli, the handle being six, and the blade three anguli long. The end is full-moon-shaped and it is directed to be used for scarification on the eyeball.

It seems that mandalagra of different sizes and shapes were used. For the instrument used for perforating the feetal cranium in uterus would searcely be thought fit for a delicate operation on the eyeball.

Soranus 4 mentions a special instrument for perforating the feetal head. Rhases 5 directs us to open the head when the child's cranium is large and cannot be brought down. Haly

> कबढ़केषु कफोल्चेषु लिखितेष्वस्त्रः चये। पिपल्यादिर्मेषुयुतः कार्यम्तु प्रतिसारणम्॥

> > Cakradatta, Jihvāroga Cikitsā.

लिखितेषिति मखलायादिना।

Tattva Candrikā, Ibid.

जन्नास्य जिल्लामाकस्य विद्यमिनाधिजिल्लिकाम्।
 क्रिस्टिम्बळलाये य तीकाभिकंकवादिभिः॥

Cakradatta, Mukharoga Cikitsä.

विखनं मखलाप्रेण कत्तं व्यं दिनानां भवेत्।

Pālakāpya, III. i.

पूर्वचन्द्राकत्यायमञ्जायम् लेखनार्यमको ।

Pālakāpya, III. iii.

^{*} Soranus, II. viii., P. 366.

a Rhases, Cont. xxii,

Abbas¹ also advises us to open the head when it is preternaturally large. Actius2 also gives a similar discription. Some authors recommend the polypus-scalpel or the phlebotome in embryotomy. The embryotome figured by Albucasis³ is a straight two-edged blade, and we may conjecture that the mandalagra used by the Hindus for perforating the feetal cranium was a similar instrument.

KARAPATRA OR SAW.

It literally means, "an instrument having the blade in the form of a hand", the fingers being represented by the teeth of the saw. Others explain, as Dallana4 points out, the name from its resemblance to a carpenter's saw. It seems that saws of various sizes were used. Suśruta mentions its length to be six anguli, Vägbhaṭas describes it to be ten anguli

Nivandha Samgraha, I; viii.

 विदेऽत्यां करपवना खरधारं दशाहलं। विसारि दाहुलं स्थादनं सत्सद वसनं॥

Aşţāngā Hṛdaya Samhitā, I. xxvi.

करपवाच्यां शास्त्रमाइ केंद्रे इत्यादि करवत् पव यसा तत् करपतं, पङ्गिम राचितो यद्याकारो भवति तद्दत् यत् कस्टकेराचितं तत् करपवसुच्यते। करात् क्यात'। करपव' खरचारं, खरा, तीका, धारा यसा तत्त्रवाविधम्, तथा दशाङ्गलम्,

¹ Haly Abbas, Pract. ix. 57.

Actius, XVI. 23.

^{*} Graco-Roman Surgical Instruments, Pl. viii, fig. 7.

[•] करपविभित्ति करवत् पत्रं करपत्रं यथा करोऽङ्ग लिभिराचितो भवति तहत् यत् कग्रुकै-राचितं स्थात्तत् करपतमुच्यते । चन्ये तु करपतशस्त्रं करपताकारमित तथ धादशाङ्गलं तनानर वचनात्। ननु यदि तन्तानरात्तद् द्वादशादुनं करपतम् चते वर्षं स्ततने विरोध: कुत: खतन्ते करपतस्य निर्दिष्टप्रमाणलात् श्रीयानि तु पङ्गुलानि इत्यनेन वाको न पडाग्रुलमेव करपवम् स्वात्र हादमाङ्गलं नैवम् तिषाम् नामाभिरिवाकतयः प्रायेण व्याखाता इत्यस्वात् स्वात् प्रायः बन्दोऽनुवर्षं तेतेनायमयं, श्रीषानि प्रायेण पड्डुलानि एवं शस्त्रमानेऽन्यवाध्यविरोधः ।

long and two anguli broad; while Bhoja¹ alludes to a saw, twelve anguli long. The edge of the instrument is described as rough and serrated; and this is the only instrument that need not have a very sharp edge.

The handle of the saw should be well formed and pegged. Its principal use is to saw a bone. Sometime it is recommended for the purpose of scraping.

Saw is frequently mentioned by the Greek and Roman authors in the descriptions of operations on the bones. Celsus" mentions it in describing the amputation of a gangrenous limb. With reference to fractures of the bones of the head, Paul says³: "But the mode of operating with saws and the instrument called chemicides or modioli (trepans?) is condemned by the moderns as a bad one." Evidently he means flat cranial saws. Galen also mentions the "knife-shaped saws."

- In modern times the saw is still used for identical purposes in surgery.

There is no mention of trephine in Hindu surgery though Jīvaka (500 B.C.) is said to have practised cranial surgery with success⁵. Pandit Vallala describes⁶, in his Bhojaprabandha or

देखें न दशाइल परिमाणं, तया विलारे दाइलं, परिमरे घडुलदयपरिमितं तथा मूखा दलं मुखा दलाकारा दल यस तत्त्रयाविधं, तथा स्वत्मदवस्यनं, तसद खड्गादि सृष्टिः वस्यनं, कौलादिना वस्यनं, त्सदय वस्यनञ्च ते तसद वस्यने, शोभने त्सद वस्यने यस तत्त्रया-विधं। तब चड्यां हिंदे, हेदन कर्यानि योज्यं।

Vägbhatärtha Kaumudī, I. xxvi.

¹ See foot-note 4, P. 230.

^{*} Celsus, VII. xxxiii.

³ Paul, VI. xc.

Galen, XVIII. 331.

See Mahavagga, VIII. 1.18. Sacred Books of the East. Vol. xvii.

^{*} See foot-note 1, p. 60.

Annecdotes of King Bhoja, a surgical operation performed on the king. He was suffering from a severe pain in the head. Medicines did him no good, and so to give relief, surgical interference was thought necessary by two brother surgeons who happened to arrive in Dhar at that time. They are said to have administered a drug called sammohini to render him insensible. They then trepanned the skull and removed the real cause of his complaint. They closed the opening, stitched the wound and applied a healing balm. They are then said to have administered to the king another drug called sañjibani to accelerate the return of consciousness.

Trephine was well known to the ancient Greeks and Romans. Hippocrates mentions a trephine or a saw having a circular motion, in the treatment of injuries to the head. Paul also mentions trephine, the use of which is, he says, condemned by the moderns. Sprengel remarks, that "Galen was averse to the use of the trepan, though he performed the operation on the head occasionally."

3. VRDDHIPATRA.

This sharp cutting instrument is called vrddhipatra from its resemblance to the leaf of a medicinal plant called vrddhi. Two varieties of this knife are described by Vagbhata⁴—one is

Hippocrates, III, 371, 374.

Hist. de la Méd., 18.

Adam's Commentary on Paul, VI, xc. Vol. ii., p. 436.

इडिपवं चराकारं केट भेदन पाटने।
 च्हळ्यमुचते शोफ गच्चीरे तु तदन्यदा।
 नतायं प्रष्ठतो दीर्घ इस्तवक्षं यदायदं॥

straight throughout and it is to be used for opening pointed superficial abscesses; and the other has the end bent or curved. Again amongst the second class of curved knives, some have their ends long and therefore called dīrgha-vaktra or long-mouthed, and these are to be used for opening the deep seated abscesses, while others have their ends short and therefore called hrasva-vaktra or short-mouthed, and these are to be used for superficial abscesses that would not point. Susruta describes them to be six anguli long. Dallana in his commentary says:—Both the varieties, one with a curved,—and this is called a kṣura or razor,—and the other with a resected point, should be seven anguli long; the handles and the blades should measure five and a half and one and a half anguli respectively." These are to be used for cutting through a part, partially or completely, and also for puncturing it.

इिष्यवाख्यां सम्बमाह इिष्यविम्त्यादि इिष्यवं नाम सस्तं, घराकारं, घराकितं, घरस लोमच्हेदकः सम्विशियों नरसन्दरायां। तस इित्यतामीयभ इचस्य प्रवसद्य फलक वात् इिष्यवाख्यं लभते। तद इिष्यवं नाम सन्तं केंद्रे भेदने पाटने च कर्मांचि योज्यमिति चहन्त्यमित्यादिना विषय विशेषे इिष्ठ पत्रसातार मेद उच्यते। यत् इिष्यमं चहन्त्यां सरलायभागं, भावतायमित्ययं:। तत्, उन्नते, उिक्ते, शोके, शोधे, योज्यं। मन्त्रीरे, मेद चादि धातुस्त्रे शोके, तथा तदन्यया, भनुनते च शोके, यत् प्रवतः, प्रवदेशे नतायं वकीभृतायभागं, कुधितायमित्ययं:। तत् इिष्यमं मन्त्रते च शोके इस्त वक्तं, दीर्ष सुन्तं, कस्त मुखं वा योज्यं। यथाययमिति मधीरे शोके दीर्षवक्तं, चनुन्नते च शोके इस्तवक्रमित्ययं:। मत्त विविधं इद्विपत्र सन्त्यमुक्तम्, हे चिष् सप्तानुल प्रमाणे, वयोरपि चवैपचातृल इन्तं कार्यं सावै। इद्विपत्र सन्त्यमुक्तम्, हे चिष् सप्तानुल प्रमाणे, वयोरपि चवैपचातृल इन्तं कार्यं सावै। सिदनंः, भेदं, एकिशन् शारीरदिशे शस्त्रमाण्याध्य चपर दिशा सन्तायस्य निकायनं सिदनं। पाटनं, विदारचं फाइन इति लोके।

Vägbhaţārtha Kaumudī, I. xxvi.

[े] इतिपतिनिति, इदे: पचिमव इदिपतं तच दिविषं एकं खिलाएं, दितीयं प्रयतायं, दे अपि सप्ताहृत प्रमाये दयोरिप अदं पचाहृ कं इनां कार्यं सादाहृतम् अतम् इति अनयोधंध्ये अधितायं इदिपतं सुरमाष्ट्रः।

One form of the vrddhipatra resembles in shape the razor used by the barbers,—not the English razor that has now become common in Bengal, but the country-made razors which are still used by the barbers in the North-West Provinces.

Susruta recommends the use of razor, scissors and pinchers for shaving the parts before operation; for "the hairs", he says, "prevent the healing up of the wound rapidly". He again uses vriddhipatra as a knife and observes:—"If bitten by spiders whose bites are amenable to treatment, the area of the wound should at once be excised out by the vriddhipatra, and then actual cautery applied by the red-hot jämvavaustha probe till the patient requests for its withdrawal".

Suśruta uses the vrddhipatra knife for the removal of the scrotal tumour and says³: "The scrotal tumour is to be well fomented and bandaged. The patient should then be cheered up, and leaving the testicles intact, underneath the me lian raphe, the tumour should be excised by vrddhipatra knife. The fatty tisues being

Sušruta Samhitā, IV. i.

Ibid, V. viii.

मिन्नां चावेटा पहेन समायासातु मानवं। रचेत् फले सेवनीच ब्रियवेच दारयेत्॥ मेदसतः ससुबुख दयात् जासीससैयवे। बजीयास यथोड्टिं।

रोमाकीणीं वर्षो यस्तु न सम्यगुपरोहति। चुरकर्भरीसन्दंशे सस्यरोमाणि निर्देशि॥

साध्याभिरामिलुताभिदेष्टमावस्य दिहिनः ।
 इडिपवेष मितमान् सम्यगादंशसुद्धरेत् ॥
 जाम्बष्टेनाग्रि तमेन दहेदाकर वारवात् ।

removed, powdered ferri sulphas and rock salt are to be dusted over the wound and proper bandages applied."

Vṛddhipatra was also used by the ancient veterinary surgeons. Joyadatta Suri writes¹: "The knife known as vṛddhipatra is shaped like a kṣura or razor. It is three aṅguli long and should be used by the wise to incise a suppurated abscess". In Pāla-kāpya⁹, we find that "it is ten aṅguli long; the handle being six aṅguli and the blade four aṅguli long and three aṅguli broad. It is used for seission and excision". He uses it also in opening a sinus after well ascertaining its course by means of a probe³.

Hypodermic medication:—The use of hypodermic syringe was not known to the Hindus. They were acquainted however with the hypodermic method of exhibition of drugs. Śārngadhara*

> वाङ्गलं विश्वपत्रच चुराकारं प्रकीर्तितम्। पक्रशीचादिषु प्राज्ञः पाटनं तेन कारयेत॥

> > Asvavaidyaka, XIV. v. 22.

श्रम्बेण इंडिपन्ने च नाऽसि(शि)तेन सि(शि)तेन दा। श्रम्बकश्रीण निष्पात: सुपक्षं पाट्येडियक॥

Pālakāpya, III. iv.

इंडिपते च नागानां कुर्याच्छेदन भेदने।

Pālakāpya, III. i.

ै चय निषययनाधायोक्तेन विधिना सुयन्तितं वारणमनिविधासाऽऽग्र(यि)व्य सम्भानुनतं गतिमनं सन्त्यमुखं नाङ्गीत्रणमेषणया च विदित्वा इहिपतेण गस्त्रेणानुलोमं प्यप्रति,रणार्थ-चोदं कुर्यात्॥

Pālakāpya, III. xv.

प्रचिय वा चुरियाङ केवलानिलपीडितम्।
 तत प्रदेशं दयाच पिष्ट गुञ्जाफलेः कतम॥
 तेनाववाहुजा पौड़ा विपची रहमसी तदा।
 चनापि वातजापीडा प्रश्नमं याति वेगतः॥

directs us to scarify a part with a razor and then apply an ointment of guñjā (Abrus precatorius) in sciatica, scrofulous glands of the neck, etc. For treating a person in the state of unconsciousness caused by the derangement of all the humours, he directs us to scarify the anterior fontanelle with a razor, then to apply as much medicine as can be carried on the point of a needle to the part and rub it with fingers. The medicine is to be prepared thus:—take aconite 1 pala, quicksilver 1 śāna; mix, and put inside two sorābas or eartheu basins smeared with powdered glass and placed face to face. Apply some external application over this and put it on fire for six hours. Then open the basins, take the soot collected on the upper basin and deposit it in a glass vessel quickly to prevent exposure. Caraka² also advises us to apply a medicinal paste on a cranial incision, shaped like

Särfigadhara Saifigraha, II. zii.

[े] विषं पलनितं स्तः शांणिकसर्गयद्यस्य ।

तस्यं सम्पूटे च क्रवा काखिलिमधरावयोः ॥

सुद्रां दस्ता च संशोध तत्रकृष्णां निवेशयेत् ।

विक्रं शनैः शनेः कृष्णांत प्रहरवय संस्थया ॥

तत उत्पाद्य तनसुद्रासुपरित्ये सरावके ।

संलग्ने यो सर्वेद्धमः तं रश्जीयान्द्यनैः शनैः ॥

वायुस्पर्यो यथा नस्मान् ततः कृष्णां निवेशयेत् ।

रसः स्थीसुखेलग्रस्तुष्या नियाति सेषजम् ॥

तावन्याचो रसो देयो स्न्हिते सद्रिपातिनि ।

परित्र प्रक्रिते सृद्धितेऽपि हि जीवित ।

तवेव सप्दंष्टस्य स्तावस्योऽपि जीवित ।

यदातापो भवेत् तस्य सध्यं ततः दीयते ॥

विषद्धित कफमार्गः स्रोतसंरोधकत्वायुयः। सतदव व्यसियार्गः स्राटसाध्यलिङै विश्वीनयः॥

the foot of a crow, in case of snake-bite when he becomes unconscious but his life is not completely despaired of.

4. NAKHA ŠASTRA OR NAIL PARER.

Suśruta¹ mentions its length to be eight anguli. Dallana³ says that its blade is two anguli long and one anguli broad. Vāgbhaṭa³, on the other hand, describes the length to be nine anguli. Arunadatta⁴ thinks it to be a double instrument, one end having a straight edge and the other an oblique one. Some explain⁵ that two different kinds of nakha śastra—one with a straight and the other with an oblique edge—are directed to be used.

चर्मकथायाः करूकं विज्ञसमं सृद्धिकाकपदमस्य । इत्वा कुर्थात् कटभीं कटुकोटफला प्रथमनस्य ॥ Caraka Samhitā, VI. xxv.

¹ तव नखगर्थेषणावटाहुची म्योवत्यने।

Suáruta Samhitā, I. viii.

- नखश्विति नखानां द्वेदनाय यस्त्रं नखशस्त्रं तस्य फलं बाङ्ग्लायामम् एकाङ्गल विस्तृतम्।
 Nivandha Sanigraha, I. viii.
 - वक्रजेवारं दिसुखं नखग्रस्य नवाहुलं।
 सूच्याच्योड्तिच्छं देवेद प्रवहान खेखने॥

Aştanga Hrdaya Samhita, I. xxvi.

- मखम्म नखन्देदकं प्रसिद्धं। तद वका चन्द्रधारा यस तदेवम्। तसेकं मुखं वक्रमन्दरेनु स्पटम्। Sarvāngasundarī, L. xxvi.
- े नखगस्त्रमाह वक्रज़ेवारिमियादि नखानौ हिदनाय यस्तं नखगस्तं तत् विमुखं वि वि:

 प्रकारं मुखं यसा तविमुखं तथा वक्रज़ेधारै एकं वक्रं धारं घपरम् स्वजुधारं सात्, तथा

 नवाङ्गं उभयोमपि देर्व्येण नवाङ्ग्यपिमितं तच नखगस्तं शब्धोबृत्यादौ योज्यं

 शब्धानां करुकदीनामुबृति कहावं गब्धोबृतिः प्रव्यानं चेरा इति यसा प्रसिविः लेखनं

 चौचन् इति लोके।

 Vägbhatartha Kanmudi, I. xxvi.

They are principally recommended for cutting, puncturing and scarifying; and also for the extraction of needles and minute foreign bodies from the soft parts.

There is no mention of a many-bladed scarificator in the surgical books of the Hindus, but its office was performed by the nakha sastra, in wet cupping, by making parallel incisions close to one another.

Paul² alludes to an instrument compounded of three blades joined in such a way that at one stroke, three scarifications were made; but he prefers a single scalpel for the purpose.

Pālakāpya mentions an instrument called rampaka³, having the handle ten anguli and the blade three anguli long. It is to be used for paring the nails and cleaning the feet of the elephants.

5. MUDRIKA.

It is described to be a cutting instrument of the size of the last phalanx of the index finger⁴; it is also called anguli-sastra or finger-knife. Vāgbhaṭa describes this instrument but not clearly. He says that the mouth of the anguli-sastra looks as if coming out of a ring, and the blade is half an anguli wide. A ring, having the size sufficient to admit the terminal phalanx of the index

Suśruta Samhitā, I. viii.

Pălakāpya, III, xxx.

इडिपत नखगल सुद्रिकोपलपःकाइ धारानि हेदने भेदने।

Paulus Ægineta, VI. zli.

रस्यकसाङ्ग्लमुखो दगाङ्ग्लस्य पादशोधनाय नखकोदनाय चेति ।

प्रदेशिन्यगपर्वप्रदेशप्रमाणामुदिका।

finger, should be soldered to it. The base of the instrument has a thread tied to it.

It is recommended to be used for cutting through neoplasms in the throat. In its uses, Vāgbhaṭa says that it resembles the maṇdalāgra and vṛdidhipatra; and so was sometimes required for perforating the skull of a dead fœtus in the uterus of its mother².

Dr. Simpson of St. Andrews (1744) is said to have invented an instrument, a "ring scalpel" for opening the skull. It consists of a loop of steel, through which the finger is to be passed

> कृष्यांदह्न (लगस्तकं। सुद्रिकानिर्गतसुखं फलील बाहु लायतं। योगतो इश्विपत्रेच सम्बन्धारं च वा ससं। तत्पदिशिक्य पर्व्यप्रसाधारंन सुद्रिकस्। सुद्रवहं गलकोतो रोगहेदन सेदने॥

> > Aşţānga Hṛdaya Samhitā, I. xxvi.

कुर्यदियादिना षह लिशस्त्रकं व्यक्ति । सृद्रिका षह रीयकेण निर्गत निकान सुखं यस तत्त्वाविधं सृद्रिकानिर्गतसुखं तथा फले फली हे ये ष्वं ह लायतं ष्वं ह षसाच विकार षह लिशस्त्रकं षह लिगास शस्त्र कुर्यात् । तस योगतः प्रयोगे इिंदिष्य म्हालायेण वा समतृल्यं भवति । लिखने च्हे देने इिंदिष्यवत् योज्यं किच्या हिंदन भेदन पाटने मन्यलायवत् योज्यंभित्ययः । तदित्यादि तदह लि शस्त्रकं प्रदेशिक्य पर्वप्रमाणापण सृद्रिकं कुर्यादिति योज्यं । वैदास्त्र प्रदेशिकौ नासी चह लिसस्ता ध्यं यत् पर्वं तत्त्वचा तस्त्र यत् प्रमाणं परिमाणं तदपंचा तत् प्रवेशीपयुका सृद्रिका यसा तत्त्वचाविधं । सृद्रिका सुदरी षाङ्गी दित वा स्थाता । तथा स्ववतं सूलदेशे स्वेणवतं तम् गलसोतो गतानां रोगाणां धेदने भेदने च योज्यं ।

Vāgbhaţārtha Kaumudī, I. xxvi.

शिक्तकी नाम ती स्दी शस्त्रदारवमहंत:। मक्तलाङ्गुलि शस्त्राभ्यां ततकक्षं प्रशस्ति। हिंदपतं हि तीचार्यं न योनाववारयेत्॥ and from which protrudes a sharp pointed blade about an inch long, by which the cranium was pierced 1.

In the pseudo-Hippocratic treatise² a knife to fix on the thumb and dismember a fœtus in utero is mentioned. This knife is called by Turtullian³ the "ring knife", whereby the limbs are advised to be cut off in the womb. It is intersting to point out that mudrikā also means a ring.

The veterinary surgeons still use a scalpel blade mounted on a ring⁴, through which a forefinger is passed to dismember foals and calves in exactly the same way.

6. UTPALAPATRA.

This knife is described to have the shape of a petal of the blue lotus. The end is long, sharp and pointed. The utpalapatra is dīrgha-vaktra or long bladed, while the arddhadhāra is the hrasvavaktra or short bladed knife⁵. It is to be used for cutting through and puncturing the parts.

दीवं जस्तवातं यदायद्यं।

चत्यलाध्यईधाराख्ये भेदने ६दने तथा॥

Aşţābga Hrdaya Samhitā, I. xxvi.

छत्मलप्रवाख्यध्यवैधारास्त्रे शास्त्रो साह उत्पर्तत्वादि उत्पर्तस्य सध्यवैधारस्य ते साह्यो ययोः शस्त्रयोः से उत्पर्ताध्यवे धाराष्ट्रये प्रस्ते तया, यद्याक्रमं दीर्घ प्रस्त वक्षे भवतः। तस्र उत्पर्ताख्यं दीर्घवक्षं, सध्यवैधारास्यं प्रस्तवक्षमितयः। उत्पर्ताद्यं शस्त्रं गस्त्रते तन्नानगरदर्भनात्। तस्य सलस्य उत्पर्तप्रवादात्त्रस्यविधिक देध्यं मिति स्थितमः धारा यस्य तत् सध्यवैधारं। इन्तक्तवयोर्मध्ये फलसीव विश्वदिधिक देध्यं मिति वर्षते। तद्य सष्टाक्ष्यावतं उरिस सक्ष्णुल विसारं।

¹ Ed. Med. Essays, vol. V, Part I, P. 445.

³ Hippocrates, I. 463.

^{*} De Anima, 26.

^{*} Greeco-Roman Surgical Instruments, Pl. vii. fig. 1.

In the Asvavaidyaka, the utpalapatra and vrihipatra knives are recommended to be used in puncturing the veins in phlebotomy¹. "The surgeon who is practically acquainted with the methods of puncturing the veins, should use the utpalapatra and vrihipatra knives for the purpose."

When used for puncturing the large veins the knife is recommended to be encircled with thread at a short distance from the end to prevent unnecessary injury to the vessels by plunging the the knife deeply².

Hippocrates similarly "gaurds his phlebotome in the surgical treatment of empyema, by having it wound round with a rag, leaving the breadth of the thumb nail at the point." 3

Both the utpalapatra and vrihimukha knives are thus described in the Aśvavaidyaka⁴: The "vrihimukha knife should be six aṅguli long and half an aṅguli wide. The utpalapatra should also be similarly made."

The utpalapatra knife is recommended to be used for incising

Aśvavaidyaka, XIV. v. 23.

मृतकेश च संवेधा सुखं शस्त्रस्य वृद्धिमान्।
 स्वाप्रमार्थ संस्थाप्य ततो विसावयेत शिराम्॥

Ibid, XV. v. 35,

- Hippocrates, II. 258 Kuhn's Ed. and 1. 88 Syd. Soc. Ed.
- चर्तां हुलन् विसीर्थे कृष्येक्कस्रं पङ्हुलम् ।
 नासा त्रीहिमुखं सम्बक्तवा चीत्यलपतकम् ॥

Aśvavaidynka, XIV. v. 21.

शस्त्रेकोत्पलपतेच जीहिपतेच वा भिषक्। श्रिराविधविधि सम्बन् स्टलक्षा प्रयोजयेत्॥

the abdominal parietis of the horse; then a tube is to be pushed through the wound in the operation of paracentesis abdominis.

The phlebotome used by the Greeks is nowhere described in their books; but from considerations of all the various operations to which the instrument was put bears out the fact of its being a sharp pointed, double-edged and straight lancet. The phlebotome of the Greeks might have then resembled in shape the utpalapatra of the Hindus. It was used by the Greeks for various operations besides phlebotomy, as for the opening of abscesses such as the parulis or gum boil², puncture of cavities containing fluid as in opening the abdomen for ascites³, incising the tunica vaginalis as in excision of hydrocele sac⁴ and for dissecting out warts⁵ and sebaceous cysts⁶.

It is interesting to note that Pālakāpya⁷ mentions utpalapatra and describes it to be eight anguli long, one and a half anguli broad and double edged. He uses it for puncturing vessels etc.

Aśvavaidyaka, LII. vs. 25, 26 and 27.

मधीवा नामित: क्यंक्टेदनं चतुरङ्ग्नि॥ मधीवा नामित: क्यंक्टेदनं चतुरङ्ग्नि॥ मस्त्रेचीत्पलपतेचा नामभागे विचचण:। एकमिवाङ्गुलं मस्त्रं कुचीचापि प्रवेमयित्॥ विधवणे ततस्त्रिम् नालिकां वस्त्रविदिताम्। प्रविष्य गालयेदारि यावदेकीष्ठलाचवम॥

Paul, VI. xxvii.

² Ibid, VI. L.

[·] Ibid, VI. lxii.

^{*} Ibid, VI. lxxxviii.

^{*} Ibid, VI. xiv.

^{&#}x27; बीहिसखप्रमाणसुगलपव' भेदनाव'।

7. ARDDHADHARA.

It is difficult to ascertain the exact shape of this knife. Some translate it as a "single edged knife," but it really means, as Dallana explains, an instrument which has a sharp edge for half the length2. It is also called cakradhāra. Vāgbhata has a variant reading-adhyārddhadhāra-which means an instrument having a sharp edge for more than half the length3.

It is eight anguli long; the blade is two anguli long and one anguli wide, and the handle six anguli long. It is to be used for incision and division of parts of the body.

8. Süci or Needles.

Three needles are recommended to be used for applying sutures. They should be strongly made and rounded in shape. At one end they are flattened, grooved and pierced with an eye for the suture. The groove is said to have been intended to be the bed of the suture during stitching to prevent it from doing any harm to the tissue. In fleshy parts such as the thighs, a three ribbed needle, three anguli long, is advised to be used. For less fleshy parts and wounds about the joints, a similar straight needle but two auguli long should be employed, while for suturing the wounds of the stomach, intestines, scrotum and the vital parts of the body, preference is given to a needle curved like a bow, two and a half anguli long and having the pointed end

Hærnle's Translations of Suśruta Samhita, Bibl. Ind. I. viii.

चंधारिमति, चंदं धारा यसा तत् चंदंधारं, चक्रधारिमति प्रसिद्धं तच चटाङ्क लायतं परिस बहा ल विसार' हा हू लंफल'। चने त्वध्य देघीरिमिति पटिना, चिकम दे धारायसा तत् अध्यवेधारम्। Nivandha Sazigraha, I. viii,

Ben foot-note 5, P. 240.

shaped like a paddy. In thickness, these needles are described to be equal to the stalk of the flower of mālatī (Jasminum grandiflorum). They should have sharp fine points and good shape¹. The needles are also recommended to be used for extraction of foreign bodies from the soft structures and also for evacuating abscesses².

देशिऽल्यमांसे सभी च म्ची इत्ताङ्गलहयं। प्रायता वाङ्गला चसा मांसले वापि पूजिता॥ धनुव्येका हिता सम्योपलकोषोदरीपरि। द्रव्येतास्त्रिविधाः स्वीसीखायाः सुसमाहिताः। कारयेत्यालतीपुष्यवनायपरिमख्यलाः॥

Suśruta Samhita, I. xxv.

इनागृद हदा: पात्रे विसः नृषोऽच सीवने ॥ मांसलानां प्रदेशानां वासा चाहुलमायता । भल्पमांसास्य सन्धिस्य त्रणानां दाहुलायता । मीहितका घनुनेका पकानागयनग्रेस । सा सावदाङ्गल सन्तां इनासायनुरङ्गला ॥

Aştanga Hrdaya Samhita, I. xxvi.

तिस्यां स्वीनां विषयविशेषे याकारभेदानाङ नांस्तानामित्यादि 'नांस्तानां' कव्या-दीनां शरीर प्रदेशानां सीवनार्यं स्वी, 'वासा' विकोशविशिष्टा तथा बाङ्गुलनायता, यहल्ययदीयां कर्णव्या, यसाम्बासत्व नयभागसीव न तु सव्यांवयवसा। स्व्याः सर्व्या-वयवसा दि साधारणती इत्ता कारत्वनिद्देशदितिगस्य'। यसा यपि गृद हद पाश्रत्वं सानान्योक्या कथितसेव यत्यमांसलस्वान संस्थितानां, सत्यास्य संयितानांच त्रणानां सीवने वाङ्गुलायता, यङ्गुलिबय दीवां, स्वीकर्णव्या, पद्यागयी, यासाशयी तथा 'नसंस्' वत्यादिषु संस्थितानां व्यानां सीवने, ब्रीदि वका, पाटलादि ब्रीदिवनस्वा, 'धनुवंद्वा' धनुवंदकाकारा या स्वी सावंदाङ्गुला, व्यवंद्वानुलाके क्षेदः। सर्वेत्यादि परिण सन्वय्यते।।

Vägbhaţārtha Kaumudī, I. xxvi.

म्चीकुश्पताठीमुखशरारीमुखान्तमुंखिवकृशकानि विसावगी।

In modern times, the surgeons use fully curved, half-curved and straight surgical needles. Waring remarks: "The shape of the needle which ought to be used for closing an incision depends upon the depth and accessibility of the wound. In deep wounds, or wounds which are not readily accessible, curved needles will be found to be most useful, while for shallow cuts straight needles will be most convenient."

Suśruta makes mention of a javamukhī needle² (lit. having the sharp end shaped like a barley corn) for passing a double ligature smeared with escharotic ointment, across the base of a tumour in opposite directions. Then by cutting through the nooses, and tying together the contiguous ends of the ligatures, the whole of the growth is encircled and strangled by them, exactly in the same way as in modern times a nævus is ligatured by means of a nævus needle. Cakradatta also quotes this description of the method of extirpating tumours by ligatures.

Erichsen says³: "When the tumour is small, an ordinary double ligature may be passed across its base, by means of a common suture needle; and the noose being cut and the thread tied on each side, strangulation will be effected. When it is of larger size, and of round shape, the most convenient method is that recommended by Liston. It consists in passing, by means

Sušruta Samhitā, IV. xvii. Cakradatta, Nādīvraņacikitsā.

¹ Manual of Operative Surgery, By H. J. Waring, M.S., M.B., Third edition, P. 42.

चर्नुदादिष् चोत् चिष्य मूले स्वं निधापयेत्।
 म्चौभियंववकाभिराचितं वा समन्ततः।
 मूली स्वेन वधीयाच्छित्रे चोपचरिद्वयम्॥

^{*} Erichsen's Surgery, Vol. II, P. 73,

of long nævus needles, fixed in wooden handles, and having their eyes near their points, double whipcord ligatures in opposite directions beneath the tumour; then cutting through the nooses, and tying together the contiguous ends of the ligatures until the whole of the growth is encircled and strangled by them."

There are many instances of the use of surgical needle by the Greek and Roman Surgeons. Needles of different sizes are recommended. Celsus mentions a large needle in describing the operation of suturing the abdominal parietis¹, and another, evidently a small needle, which is said to have been used in the treatment of staphyloma of the cornea². The needles were either round or three-cornered. "A few three-cornered needles of Roman origin have been found, although they are rare" (Milne³). Paul uses a needle in suture of the upper eyelid, and other modes of operating for trichiasis⁴, for the repair of wounds of the peritoneum⁵, and recommends a large sized needle containing a double thread to close the peritoneum in the operation for enterocele⁶.

Pālakāpya mentions sūcī or needles for stitching wounds.

They are eight anguli long, shaped like the tusk of an elephant and are either three ribbed, or four ribbed, or round, smooth and

¹ Colsus, VIII, xvi.

² Ibid, VII. vii.

³ Greeco-Roman Surgical Instruments, P. 75.

^{*} Paulus Ægneita, VI. viii.

^{*} Ibid, VI. lii.

^{*} Ibid, VI. lxv.

[े] मुची सेवनाये। भटाङ्ग्लं नागदनाक्रति। त्रास्था चतुरसा वा इट्रा समाहिता यथा गलाका वने वस्मविध्ययं म्।

strong. He reserves curved three-cornered needles for fleshy parts and round needles for skin, veins, nerves and arteries.

Caraka recommends the use of leeches, knife and needles for extracting blood from the piles². He also advises us to use needles for pricking the patches of leprous spots³ before the application of leeches for extracting blood.

9. KUŚAPATRA.

It is a form of knife resembling in shape the leaf of a kuśa grass (Poa cynosuroides)⁴. The instrument should be six aṅguli long (Suśruta); the blade measuring two aṅguli (Vāgbhaṭa)⁵

> याः न्यस्तिविधाः प्रीताः शस्त्राध्याये संस्थिताः। नागदनाकृतिः ना विकोषा चेति निवधात्॥ चस्त्राधितं नागदन्तया मांस्त्रं च विकोषया। लकसायु धमनीस्यं च शिरातं चैव इत्तया। चाहायं सञ्चयनायां मृत्या सीवनिमध्यते॥

> > Pālakāpya, III. i.

जजीकोिम: तथा मस्ते: स्वीमिर्वा पुन: पुन: ।
 चवर्तमान' कथिर' रक्तार्थीय: प्रवाध्येत ॥

Caraka Samhita, VI. ix.

प्रविक्रतमन्त्र' कुछ' विरेचयेवा जलीकाभि:।

Ibid, VI. vii.

कुशपनिति, कुशपनतुल्यं कुशपनं तन्याननाइ :—
 षड्लैस्चकं निदादङ्कं फलमुखते।
 इनं सात् नाङ्कं मध्ये कुशपचना लचगम्॥

Nivandha Samgraha, I. viii.

जुमाटी बदने बाब्ये बाहुलंस्याचयोः क्लं॥

Aştanga Hrdaya Samhita, I. xxvi.

कुमाटीवदने वे सस्ते, सान्ये विस्तावय विषये योज्ये। तयो: कुमाटी वदनयो: फर्ल दाहुलं, बहुलदर्थ परिमितं स्नात्।

Vagbhatartha Kaumudi, I. xxvi.

and the handle four anguli, but according to Bhoja, the handle is three anguli long. It is to be used for draining pus from abscess. The handle has a ring like ornamentation, about one anguli in diameter. Another variant reading describes the blade, the ring, and the handle to have the lengths of two, three, and two anguli respectively. This would make the total length of the instrument to be seven anguli; so evidently there is some lapsus calami in the second reading.

Cakradatta uses kuśapatra as a bleeding lancet and says¹:

"Out of the twelve vessels that lie on the sides and underneath the
tongue, select the two large bluish vessels on either sides of the
tongue, raise them up by vadiśa or hook and puncture them by the
kuśapatra knife and then, after bleeding, apply a paste of treacle
and ginger to the wound". In the Yogaratnākara², the author
advises us to adopt this method of bleeding, in the treatment of
tumours in the neck.

Pālakāpya mentions kuśapatra and describes it as being shaped like a kuśa grass³. It is nine aŭguli long—the handle being

Yogaratnākara, P. 321.

Pālakāpys, III. xxx.

[े] जिज्ञाया: पार्चतीऽधक्तां जिरा दादम कौति ता:।

तासां स्यूलिमरे कच्चे विध्यात् ते तु मने: मनै:॥

विक्रियेव संग्रह्म कुमपनेच बुद्धिमान्॥

Cakradatta, Galaganda Cikitsā.

अडाधः पार्थयोर्म्लाच्छिरा द्याय कीर्तिताः। तासां खूली भिरि दे च च्छिन्द्याते च मनेः मनैः। विक्रिमेणेव संस्ट्या कुमप्रवेण वृद्धिसान्। स्ति रत्ने वर्णे तिस्तन् द्यातस गुड्मादकम ॥

[ै] नवाहुलं कुशपर्तः। पञ्चाहुलं इत्तः। चतुरङ्गुलम् पर्तः। अध्याधाँहुलविसृत-सुभवती धारः। कुशपपाज्ञति गमीरपाकभेदनार्यं पङ्गुलं इत्तम् अध्याधाँहुलं पर्तः।

five or six anguli and the blade four anguli long. The blade is one and a half anguli wide and is sharp-edged on both sides (i.e., double-edged). It is used for incising deep abscesses.

10. Атімикна.

This instrument is described to have the shape like the beak of the jalavardhanī bird or āṭī¹ (Turdus ginginiamus),—a bird living in the marshes. It is six aṅguli long; the blade measuring two and the handle four aṅguli. So it is of the same size as the kuśapatra to which it also resembles in function. Bhoja is of opinion that its blade is one and the handle seven aṅguli long.

11. SARĀRĪMUKHA.

This instrument is a pair of scissors resembling the face of the long beaked bird called śarārī. Dallaņa describes two varieties of the bird, one with white shoulders, and the other with a red head. It is the former kind which is referred to here? Suśruta describes its length to be ten aṅguli³, while Dallaṇa mentions the length to be twelve aṅguli.

'बाटीमुखमिति, बाटी जलवर्षनी नाम पचिविशेष: तम्मुखवसुख' यस्य तत् बाटीमुख' तवाचीक' :--

> इनं सप्ताङ्गलं विद्यात् तस्त्राये फलिन्यते । षाटीसुख प्रकारं हि फलमङ्गुष्ठमायतम् ।

> > Nivandha Samgraha, I. viii.

श्रारोमुखमिति, दीर्घवत्रुः पचिवित्रेषः स दिविधः धवलाखन्धः रक्तशीर्षं धवलाखन्धस्य श्रारोति संज्ञा तन्मुखवन्मुखं तसा शस्त्रसा लोके कर्णरीति संज्ञा तास द्वादशाङ्गुलां चलत्पलासां कुर्यात्।

Ibid.

Susruta Samhită, I. viii.

दशाहुला शरारीमुखी सा कर्तारीति कथते।

It is recommended to be used for evacuating abscess¹, etc. Suśruta mentions karttarī as a synonym but Vāgbhaṭa counts it as a separate instrument. He describes karttarī as a pair of scissors used by the barbers for clipping hair and is said to have been necessary for dividing the nerves, ligaments and fine hairs².

12. ANTARMUKHA.

Suśruta describes another variety of scissors, used principally for evacuating abscesses. It is so named, for its straight cutting edges are within its curved claws⁵. It is said to be six anguli long and one and a half anguli broad⁴. It seems that the curvature of the blade varied widely; and Vāgbhaṭa describes a variety called

। साब्ये मराव्यासाविक्षिके।

Aşţānga Hrdaya Samhitā, I. xxvi.

सावे विसादनविषये कर्मांचि शरायांसा विक्रुर्वके दे शस्त्रे योज्य:। तत्र शरायांस्य शरारीमुखं शरारी दीर्घचयुः पचिविशेषः तसा मुखबदासं यसा तत् शरायांसा, तत्र चसत्पत्र दशाह संदीर्घ कार्यः।

Vägbhaţärtha Kaumūdī, I. xxvi.

" सायु मुखा कचच्छेद कर्त्तरी कर्त्तरीनिभा।

Aşţānga Hrdaya Samhitā, I. xxvi.

कर्त्तरीयस्त्रमाष्ट्र सायुत्यादि कर्त्तरीनामयस्यं कर्त्तरीसहयं तस सायुक्तदेने स्वात्रम-क्वेदने च योज्यं। कर्त्तरी काटारी इति यस प्रसिद्धिः।

Vāgbhaṭārtha Kaumūdī, I. xxvi.

े चनमुंखिमिति मध्यमुखं तह्नचणमाश्च चटाहुलप्रमाणिन जिह्नघारेण चानुतम्। अस्तमनामुखं नाम चन्नास् इव चोहतं।

Nivandha Samgraha, I. viii.

* तददनमुंखं तस्य फलमध्यदंमहुलं॥

Aşţānga Hrdaya Sarhhitā, I. xxvi.

arddhacandranan or "half-moon faced" scissors in which the blades are curved like the half-moon. It has the length of eight anguli, the blade measuring one and a half anguli. This is also to be used for letting out pus from abscesses.

Hārīta, however, mentions a sastra, called also arddhacandra or half-moon, but he recommends its use for excising the prolapsed arms of a dead foctus to effect its delivery. This instrument can not but be a knife, for it seems difficult to cut off the arm, even of a foctus, with a pair of scissors. Moreover, antarmukha has never been credited with the power of excising the arm.

13. ТЕГКИНССАКА.

It has been translated in English as a thin-edged sharp instrument or trocar. Wise, Dutt and Hoernle agree to mean by it a trocar. But it can be better explained if we understand by the term an instrument consisting of three needles fixed on a round

चपरख विश्वावण मस्त्रमाह तबदिखादि तहत् कुमाटीवदनवत्, चनामुंखं चनामुंखं नाम मस्त्रं सात्र्ये योजां तस्य चनामुंखस्यपतं चध्यवमङ्गलं स्वात्। चाचि चचितं चवे चध्यवं। सार्वेकमङ्गलमित्यर्थः।

Vägbhaţārtha Kaumūdī, I. xxvi.

े यह चन्द्रानमं चैत तथाध्यद्वाहुलं फली ।

Aştānga Hydaya Samhitā, I. xxvi.

चनमुंखस प्रकारभेदमाइ वर्षचन्द्राननित्यादि एतत् चनामृश्वं, चर्षचन्द्राननं चर्व-चन्द्राकारमुख्य भवति, तदपि तदत्, जुशाटीवदनवत् सान्ये योज्यं। तद्य फर्ने चर्बाहुनं चर्बाहुन्तपरिमाण फल्मित्यर्थः। चर्षचन्द्राकारमुखलात् चस्य शस्त्रस्थापि चर्वचन्द्राननमिति संजीति वीध्यं।

Vägbhatärtha Kaumūdī, I. xxvi.

श्वयवार्शचन्द्रेश श्रस्तेवैव सतगर्भेस वाष्ट्रयुगलं सञ्जिदा वाह्रनि:सारयेत् ।
 Hārīta Sanhitā, III, li.

wooden handle¹. According to Suśruta, the length of the instrument is six anguli. But others describe it as eight anguli long, the blade and the handle measuring three and five anguli respectively². The distance between the edges is the breadth of a grain of rice. The end of the handle is ornamented with a circular metallic plate as a ring.

It is recommended to be used for evacuating abscesses and for draining blood from the nasal polypus.

Caraka³ mentions an instrument called kūrcca and says:—
"After fomenting and thus softening the rounded nodules (of leprosy) which are fixed and hard, by heated stones and fumigations through tubes, they are to be injured by the kūrcca and the blood that oozes out, should be wiped away."

Two other instruments are described by Vāgbhaṭa as being constructed on a similar principle. One is named kūrcca and the

विक्र्यंकिसिति चयः क्यां यस्य तत् विक्र्यंकम् तच तत्वालरम् :— षङ्गुलानि तथाणौ च शस्तं कार्यं चिक्र्यंकं। फलेरलमुंखाकारेवङ्गलेरन्वितं विभिः। एकेकस्य फलस्वेयामनारं ब्रीडिसियातम्। इन्तं प्लाङ्गलायामं कार्यं क्चकम्पितमः॥

Nivandha Samgraha, I. viii.

स्थिरकठिनमञ्जलानां स्विद्यानां प्रसरप्रणाङ्गीभि:।
 कुर्वे विष्टितानां रक्षांतृक्षे शोऽपनेतव्य:॥

¹ विकृषंकिमिति तथः कृषां यस तत् तिकृषंकम् । कृषं: कृषी इति लीके । Vägbhajärtha Kaumüdī, I. xxvi.

other, khaja. The kūrcca¹, he describes as an instrument "consisting of seven or eight rounded sharp needles, four anguli long, nicely bound together by a cord and tightly fixed on a circular wooden handle." He mentions its use in the operation of scratching to cure baldness and the brown and black spots on the face. For scarifying a bald spot, Cakradatta² uses needles, rough leaves, etc. "The khaja³," Vāgbhaṭa continues, "consists of eight rounded needles having the sharp ends half an aṅguli long. It is to be introduced

गृष्यों इस के पीठस्था: सप्ताणी वा सुवस्थना:। संयोज्य नौलिका व्यक्त केश शांतेय कुइने॥

Astānga Hrdaya Samhitā, I. xxvi.

सम्प्रति कृषां व्यां यसं लचियतुमाई सर्वेत्यादि ता: स्चाः सर्वेप्त इता: वर्तुला: तथा पत्रहुला: चत्रहुलदीषां: कृषः इत्युचने । ता: स्चाः पुनः कीहमा: ? उत्तेवपीठेस्याः अत्ते वर्गुली एकियान् पृष्टे संस्थिताः, एकं उत्ताकारं काष्ठफलकं परिवेध्य स्थिता इत्यदः । तथा सप्तसंख्यका षष्टसंख्यका वा, तथा शोभनं रच्चादिकतं वस्पनं यासां तास्त्याविधाः सुवस्पनाः । स कृषः नीलिकादिषु रोगेषु कृष्टने कृष्ट्रनार्थं संयोखः प्रयोख्य इत्यर्थः । कृष्टनं भाष्ठान इति लोके । नीलिकादयो वत्यमाथा केशशातः केशानां पतनं ।

Vägbhaţārtha Kaumūdī, I. xxvi.

अवगादपदशैव पुक्कियिला पुन: पुन:।

Cakradatta, Kşudraroga Cikitsā.

भवगाद्पदिमिति गन्धीरपदं यथास्यात् तथा:मूचीनखरझन्यादिभि: पुच्छियत्वा * * *

Tattva Candrikā, ibid.

अवंश्विलं के के चेरणामि: कब्दके: खत्र:।
पालिक्षां ने स्थानां ने प्राचान ने प्रत्यक्ता।

Aşţānga Hṛdaya Samhitā, L xxvi.

खजसंज्ञकमस्त्रमाह भडोहुलमुखेरित्यादि भडोडुलप्रमाणं मुख येषां ते भडोहुलमुखा सेवडोहुलमुखे: वते: वर्मुले: भटाभि: भटसंख्यके: कर्छके: क्रतं मस्त्रं खज उच्यते। तेन खजाब्येन मस्त्रेन पाणिभ्यां इसाम्यां मध्यमायान भालीब्यमायान प्राचात् नासिकायाः भक्षक्रको हरेत्, निहरिदिवर्थः।

Vagbhaţārtha Kaumūdī, I. xxvi.

into the nostrils and turned to and fro with both hands to bleed the nasal polypi."

The Greeks and Romans used a similar instrument for identical purpose. It was called katiádion, measuring a blade of grass, and was used for opening abscesses of the womb and tonsils, drawing blood from the inside of the nose and perforating the foetal cranium.

In India, the practice of drawing blood from the nasal polypus by blades of grass is still in vogue; and Araeteus mentions it as a common mode of scarification in ancient Greece also1. "On the next day we are to abstract blood from the inside of the nostrils, and for this purpose push into them the long instrument named Katiádion, or the one named Toryne, or in want of these we must take the thick quill of a goose, and having scraped the nervous part of it into teeth like a saw, we are to push it down the nostrils as far as the ethmoid cells, then shake it with both hands, so that the part may be scarified by its teeth. Thus we shall have a ready and copious flow of blood; for slender veins terminate there and the parts are soft and easily cut. The common people have many modes of scarification, by rougher herbs and dried leaves of the bay, which they introduce with the fingers and move strongly." Paul opens the vessels in the nostrils with the reed called typha.

14. KUTHĀRIKĀ.

It is a small instrument shaped like an axe, so called from its resemblance to kuthāra, an axe which is still used in India

¹ Extant works of Armteus, P. 460.

Paul, vol. II. Sec. lx.

for cutting wood¹. Vāgbhaṭa says² that "the base of the blade is thicker and broader than the end and is fitted to a handle, seven and a half aṅguli long. The blade which is shaped like the tooth of a cow, has the width of one aṅguli." Bhoja describes the width of the blade to be a half aṅguli³. It is recommended to be used for puncturing vessels in the following manner⁴:—"Hold the handle with the left hand and put the blade on the vessel resting on a bone. Raise the instrument a little upwards and then strike over the thick base of the blade with the downward strokes of the middle or index finger, when let go

Astānga Hrdaya Samhitā, I. xxvi.

कुउारिका संज्ञकं शस्त्रमाह पृथ्रित्यादि कुठारी पृष्: स्वात्। कठारिका नामशस्त्रं पृष्: स्वात्। कठारिका नामशस्त्रं पृष्: स्वात्मस्त्रं स्वादित्यक्षे:। तथा गोदलमहश्यादां हुलानना गवां दल: गोदल सत्त्रहशं तुल्वाकारं भवां हुलायतं भाननं मुखं यस्त्राः सा तथा विवया तथा कठाव्यां कदंदस्थ्या भस्यां उपरिस्थितां सिरां विश्चेत्। तः स्वं वामहस्तेनीचीकत्य कुठाव्यामुखं शिरोपरि संस्थाप्य दिचनाङ्कत्वज्ञनीस्यां कुठारिकामसक्तमभिष्ठत्य सिरां विश्चेत्।

Vägbhaţārtha Kaumūdī, I. xxvi.

कुठारिकति कुठारतुख्या कुठारिकाः— कुठारिकाया हनां स्थात् साई सप्ताङ्ग्लायतं। फलमडाङ्ग्लायामं गीदलसहगं समम्॥

Nivandha Samgraha, I. viii.

तथा मध्यमयाङ्गुल्या वैद्योऽङ्गुत विसुक्तया ।
 ताडयेट्लियां ज्ञाला स्पर्शादवाङ्गुत्र पीडले: ॥
 कुठाव्यां लच्चित्रप्रधे वामहल ररहीतथा ।
 फलोड में सनिष्कर्म जिरां तदव मीच्येत ॥

Aşţānga Hrdaya Samhitā, I. xxvii.

¹ For figure of Kuthara as used in Ancient India, see Pl. xxii in Ferguson's Tree and Serpent Worship.

पृथु: कुठारी गोदनसहमार्बाङ्गलानना। तयोर्बदक्षया विध्येदपर्थन्यां सिरां स्थितां॥

forcibly from the under surface of the thumb". Cakradatta¹ also advises us to use it in a similar manner. To open the veins in fleshy parts, Vāgbhaṭa recommends the vrīhimukha knife, while the kuṭhārīkā is advised to be used in venesection on bony structures.²

Pālakāpya³ mentions the kuthāra and describes its shape to be like an axe. It is to be used for excision and scarification. He describes another sastra called vatsadanta (lit., the calf's tooth); it is ten anguli long; and the mouth of the instrument is one and a half anguli broad. It is also to be used for excision.

"Bleeding from the jugular vein, he (Albucasis) describes much in the same way that it is now practised by veterinary surgeons, namely, by placing a sort of scalpel bent at the point, which he calls fissorium, upon the vein, and striking the instrument with a hammer or some such body. He gives drawings of variously shaped lancets for opening the veins of the arm,"

"Ferriers bleed with a fleam, which, though apparently a clumsy method of operating, is certainly safer than the lancet in

वामक्सेन विन्यसः कुठारीसितरेश तु। ताङ्ग्येन्यध्यमाङ्गल्याङ्ग्रुटविष्टव्यसुक्तया॥

Cakradatta Śīrāvyādhādhikāra.

मांसली निचिपेई में जीडासंग्र जीडिमातकम् । यवार्डमस्यासुपरि जिरां विश्वन् कुठारिकाम ॥

Astānga Hrdaya Samhitā, I. xxvii.

ै कुठाराकृति कुर्यात्। कुठारी शस्त्रपच्छेदनावें। वत्सदनाकृति वत्सदनां दशाङ्गुलम्। एकेकमध्यक्षाङ्गुलम्खम्। एवमितानि च वीस्प्रिययायोगं प्रच्यवाये।

> कुठाराक्षतिमस्त्रीण ततसं प्रस्क्रयेक्षियक्। नातिगादं न चलघुं न घनं विरलं न च॥

> > Pālakāpya, III. iii.

Albucasis Chirrug, ii, 97; also see Adam's Commentary on Paul, VI. lx. 323.

unknown hands." "In bleeding with a fleam, the near side is most convenient. In skilful hands, there is no occasion for a blood stick, as the fleam may be struck with the right hand if it is made broad and round at the back. It also may be made much smaller and neater than that generally employed". There is a drawing of such an improved fleam which much resembles in appearance the kuthārī of the Hindus. "A fleam is rather more convenient instrument in bleeding, either from the arm or thigh, as the vein is somewhat apt to roll when a lancet is used."

15. VRĪHIMUKHA.

It is described as a kind of trocar², the sharp end being pointed and shaped like a grain of paddy. It is six anguli long, the handle being two and the blade four anguli (Bhoja). But Vāgbhaṭa³ describes the length of the blade to be one and a half anguli.

It is advised to be used for paracentesis abdominis in abdominal dropsy. Susruta says: 4 "The friends of the patient should

वौहिमुखिमित बौहिमुखिमिव मुखमस्य बौहिमुखं तच भोज:— शस्तं बौहिमुखं कार्यमहुलानि षडायतम्। बाङ्गलं तस्य बनं स्पात् तत्फलं चतुरङ्गलम्। तम्मुखं बौहिबिसारं तनुसंगृदकस्यकम्॥

Nivandha Samgraha, I. viii.

Aşţānga Hṛday Samhitā, L xxvi,

White's Compendium of the Veterinary Art, 1851, 18th ed. P. 342.

उदकोदिरणम् वातस्यतेलाभ्यक्षशेणोदकस्तित्रस्य स्थितस्यातेः सुपरिग्रहीतस्याकचात्-परिवेष्टितस्थाधी नाभेव्यामतयतुरङ्गलमपहाय रीमराज्या ब्रीहिमुखेनाङ्ग्रहोदर प्रमाणमवगादै विभ्योत् ॥ Sustrata Samhita, IV. xiv.

hold him under the axilla. Then the abdomen is to be tapped by the vrihimukha knife at a point, four anguli distant on the left side from the median line, underneath the navel." Vagbhaṭa¹ advises us to surround a broad bandage round the abdomen before tapping it by the instrument, which he recommends to be introduced up to one anguli. Cakradatta² refers to works on surgery for the surgical treatment of ascites. A small incision is directed to be made before the puncture.

In the Aśvavaidyaka, for this operation, the utpalapatra knife is recommended; an incision four anguli long is directed to be made above or below the navel of the horse, and then the end of the knife is to be plunged into the abdominal cavity up to one anguli.³ The vrihimukha is also advised to be similarly used.⁴

Hippocrates speaks of evacuating the fluid in paracentesis abdominis with an instrument which Camper thinks must have been a kind of trocar.⁵

> सजले जडरे तेलैरभ्यतस्थानिलापहै:। स्वित्रस्थाभाष्मुना कचमुदरे परिवेष्टिते ॥ वहकिद्रोदितीस्थाने विध्येदङ्गलमाचकम्। निधाय तस्मिद्राङ्गीच सावयेड्मम्बस:॥ षयास्य नाडीमाक्रस्य तैलीन लवशीन च। जगमभ्यत्य वहा च वष्टयेद वाससीदरम्॥

> > Aştānga Hrdaya Samhitā, IV. xv.

जातं जातं जलं साव्यं शास्त्रोक्तं शस्त्रकसं च।

Cakradatta, Udaracikitsa.

³ See foot-note, 1. p. 242,

^{*} See foot-note, 4. p. 241.

See the Commentary on Paul, By Adams, vol. II, P. 338.

It is also to be used for puncturing the vessels in phlebotomy (Vāgbhaṭa)¹ especially in the fleshy parts of the body.² Cakradatta uses vrīhimukha in phlebotomy and says: "The sharp end of the vrīhimukha should be kept under the palm between the thumb and index finger and is to be thrust into the seat of puncture."

Susruta directs us to use it in tapping the hydrocele:
"Then the hydrocele is to be wrapped round with a bandage. The fluid is next to be drained by tapping it with a vrihimukha on the lower part of the scrotum, little externally to the suture."
Similar directions are given in the Yogratnākara. Cakradatta also gives a similar discription.

भीहिवतां प्रयोज्यस्य तत्सिरोदरयोवध्ये:।

Aşţänga Hīdaya Samhitā, I. xxvi.

त्रीहिमुखास्य शस्त चाह त्रीहिनक्रमित्यादि त्रीहनक्रमिन नक्ष यसा तत् त्रीहिनक्षं। त्रीहिमुखं यत्शस्त्रं तत्सिरानां व्यवे व्यवने तथा उदरसा जलोदरसा व्यवे स्नानणार्यं योज्यं।

Vagbhatartha Kaumudi. IV. xxvi.

ताइयन् पौड्येबैनां विध्ये द ब्रीहिमुखेन तु ।

Aştānga, Hrdaya Samhitā, I. xxvii.

" मांसली नि:चिपेड् में बीहासं बीहिमाचकम्।

Ibid.

मांसलेध्वकाशिषु यवमाचं शस्त्रं निदध्यादतीहरूधवर्षयनातं ब्रीहिमातं वा ब्रीहिमुखेन । Sufratā Samhita, IV. viii.

> ततो ब्रीहिमुखं व्यथ्यप्रदेशे न्यस्य पीड्येत्। पङ्घतर्जनीयस्त तलप्रकादितं भिषत्।।

Cakradatta Šīrāvyādhādhikāra.

- See foot note 5, P. 123.
- मंस्वेदा म्वप्रभवं वस्तख्यान वेष्टवेत् ।
 मीवना पार्थतोऽचनाविश्वेत् वीहिस्खिण वै॥

Yoguratnäkara.

संस्वेद्य मृतप्रभवां वस्तपट्टेन वेष्टयेत्।
 सीवन्याः पार्वतोऽधसाविष्यादौहिस्सेवेष वै॥

Chakradatta Vřddhi Cikitsa,

Paul describes the operation but he recommends a sharppointed knife or lancet instead of a trocar. He says: "Wherefore we must make the patient stand erect; or if this can not be done, we must cause him to be seated; * * * . We give orders to the assistants standing behind to press with their hands and push downwards the swelling to the pubes. Then taking a sharp-pointed knife or lancet, if dropsy be among the intestines, in the perpendicular line of the navel, and about three fingers' breadth distance from it we divide the hypograstrium as far as the peritoneum."1 Celsus mentions that some perform it at a spot four fingers' breadth below the navel in the left side, and recommends us to use a perforator, the point of which should be about the size of the third part of a fingers' breadth.2 Vegetius, the veterinary surgeon, recommends paracentesis for the dropsy of cattle.3 The Arabic authors Avicenna,4 Serapion,5 Albucasis,6 Haly Abbas,7 and Rhases,8 give similar descriptions.

In modern times, we perform the operation in the same way.

"It is necessary in certain conditions to tap the abdomen in order to withdraw fluid which has accumulated there and this is usually done by means of a special trocar and canula. The site for tapping is selected, the usual spot being in the middle line, half-way between the umbilicus and the pubes. A

¹ Paulus Ægineta, Bk. VI. I. Syd. Soc. Ed.

^{*} Celsus. vii. 15; ii. 10.

³ Vegetius, Mulom, iii. 25.

^{*} Avicenna, iii. 14; iv. 13.

Serapion. iv. 7.

^{*} Albucais : Chirrug. ii. 54.

¹ Haly Abbas, Pract. ix. 41.

^{*} Rhases, Cont. xix.

small puncture about one-third of an inch long is made with the knife at the spot selected. The trocar and canula to which the rubber tubing is attached, are then thrust through the abdominal wall into the peritoneal cavity."

The Greeks did not describe the operation of tapping the hydrocele. They always preferred the open incision to puncture. Paul uses a knife for making the skin incision, but when the tunica vaginalis is laid bare, he divides it through the middle with a lancet for bleeding.² Some of the Arab authors mention the operation of puncturing the scrotum for hydrocele. If the patient be timid, and do not choose to submit to open incisions, Albucasis advises the surgeon to let out the water either with a scalpel or the instrument used for tapping in dropsy. He states, however, that the water will collect again after this operation.³ Rhases also describes this operation.⁴

In modern times, trapping for hydrocele is still practised. "When trapping a hydrocele the patient should be sitting up in a chair * * * . The scrotum, having been cleansed, is grasped from behind by the left hand * * * . A spot, free from any large veins, is selected on the anterior and lower part of the swelling, and the trocar and canula introduced with sharp stabbing movement."

Pālakāpya⁶ describes vrīhimukha as shaped like a grain of paddy and recommends it for scission and excision of muñja.

¹ Operations of General Practice. By Corner and Pinches, P. 109, 2nd ed.

Paulus Ægineta, VI. lxii.

³ Albucasis, Chrug. ii, 62.

^{*} Rhases. Cont. xxiv.

Operations of General Practice, P. 145.

[&]quot; सवगां पाटनं चैव कृष्यांडी हिम्स्बेग त ।

16. ARA OR AWL.

It is a long sharp needle in handle, so called from its resemblance to the shoe-maker's instrument known as awl. "It has a total length of sixteen anguli, with a sharp end of the size of a sesamum seed. The handle is tapering like a cow's tail and is equal in circumference to the young stem of Dūrvā (Unodon Dactylon)" (Bhoja). Suśruta mentions its length to be six anguli. Vägbhata describes the length to be one anguli, the basal half being round, and the terminal half, four cornered and sharp pointed. The terminal part is introduced into the inflammatory swellings to confirm the diagonosis of suppuration. It is also to be used to drain the congested blood vessels in the matrix of the nails as a result of traumatism².

- भारिति, अरिव श्वारा असि: वर्णकाराणां शस्त्रं। तत तन्तान्तरम् :— श्वारा द्वाटाङ्कुलयामा कत्तंत्र्या तु विशाम्पते । तिलप्रमाणन्तु फलं तस्त्राः कार्यं समाहितं। दक्षाङ रपरीणाङं इनः गोपुष्कस्तिमः।
 - Nivandha Samgraha, I. viii.
- श्रव्यचन कर्णपालीनां युधिका मुझलानना। भाराडांङ्गुल इत्तासा तत्प्रवेशो तथोवृंतः॥ चतुरसा तथा विध्येच्छीयं पकाम संगये। कर्णपालीच वहलां वहलाया न च शसाते॥ मुचा तिभागयिषरा वाङ्गुला कर्णवेधनी।

Aşţānga Hfdya Samhitā, I. xxvi.

सम्प्रति कर्णपालि व्यथन योग्यानि शस्त्राणि वज्रुमास व्यथने दत्यादि कर्णपालीनां कर्णालतानां व्यथने व्यथनविषये यृथिका यृथिका नाम शस्त्रं योज्यं। कौहशी ? सकुलानना सुकुलवत् प्रकृतत्वात् यथिका सुकुलवत् षाननं सुखं यस्याः सा तथाविधा। बारित्यादि बर्बां हुलं परिमानं इत्तं वर्त्तुलं षास्त्रं सुखं यस्याः सा तथा षढां हुल्लहेकास्या, तथा स एव बर्बां हुल्लप्रमाणः प्रवेशः प्रवेशनं यस्याः सा तथाविधा तत् प्रवेशा तथा कर्षतः इक्षाबां हुल्लाद्रपरिटात् तथा बर्बां हुल्ल परिमाणवे चतुरसा चतुष्कीका सा बारा कष्यते। It is also said to have been used for perforating a thick lobule of the ear, though for this purpose another instrument called karṇa-veḍhanī or ear-perforator—a needle specially meant for perforating the lobules of the ears,—is mentoined. It is three anguli long, having a slit or eye in the three-fourths of its length. The barbers used a similar needle to perforate the ears on the ceremony of tonsure.

For piercing the lobule of the ear, another instrument is mentioned. It is called jūthikā, from its end resembling in shape the conical bud of jūthikā flower (Jasminum Auriculatum).

Susruta uses ārā or pāṇimantha to perforate the bone in diseases of the medullary canal caused by the obstructed and deranged air¹. He next introduces one end of a tube open at

पतेन चारायाः फल' एकाङ्गलपरिमितमिति फलिति तत प्रथमार्डाङ्गलं हत्तंमपराडाङ्गलं चतुरसं तयीरभयभागयीमध्ये चयस्ययुत्रसी भागः प्रवेशयोग्य इति सृचितं। तया चारया प्रकाम संग्रये चयं गोयः पक चानीवित संग्रये सित ताहमं गोयं विधान्, तथा वहलां चित्तां स्वामां कर्णपालीच तथा विधादिति योज्यं। वहलामित्यन्तेन च्छेटः। वहलायामित्यादि वहलायाः चितमां सलायाः कर्णपाल्याः ज्यधने कर्णविधनी नासी स्वी च शस्ति। क्षीहमी १ विभागयिदा, विभागः यदिरं यन्तं यस्याः सा तथाविधा विभागयिद्या तथा वाङ्गला चङ्गलवयदीयां। न केवलमारा वहलायाः कर्णपाल्या व्यधने शस्ति चित्र विधाने कर्णविधनी नासी स्वी च शस्ति इत्ययः। कर्णविधनी स्वी च शस्ति इत्ययः। कर्णविधनी स्वी च शस्ति इत्ययः।

Vägbhatartha Kaumüdī. I. xxvi.

निक्षंत्रेऽस्थिन वा वाशी पाणिमस्येन दारिते। नाड़ी दलास्थिन भिषक् नुषयेत् पवनंवली॥

Suśruta Samhitā, IV. iv.

निक्रे इत्यादि । लङ्मांसं शस्त्रेण विपादा पस्त्रि पाणिमन्त्रेन पराशस्त्रेण विहा तत रखे विमुर्खी नाड़ी प्रणिधाय मुखमाकते चूपणेन लवनापकर्षणं करणीयमिति ।

Nivandha Samgraha. IV. iv.

both ends into the canal through the hole in the bone, while through the other end the surgeon sucks out the air by his mouth.

For perforating the ears of the elephants, a similar needle is recommended by Pālakāpya. It is known as karmāra or nālī.

17. VETASAPATRAKA.

It is a long sharp cutting instrument shaped like the leaf of the rattan (Calamus Rotang). Its edge is finely serrated and very sharp. The blade and handle are equal in length, measuring four anguli. Bhoja says: "The blade is one anguli wide". It is said to have been used for puncturing vessels in phlebotomy.

18. VADIŠA OR SHARP HOOK.

In shape it is described to resemble the ordinary fish-hook. Bhoja describes the total length to be six anguli, its hook being half an anguli and its handle five and a half anguli long. The end is bent; the curvature varies and may be shaped like a half-moon³.

> वितसपत्रमिति, वितसपतिमित्र वितसपतमत भीजः— तीष्णमङ्गुल विसारं चतुरङ्गुलायतं। पङ्गुलानि तु चलारि इन्तं कार्यं विजानता॥

> > Nivandha Samgraha, I. viii.

वेतसं व्यधने ।

Aştānga Hṛdaya Samhitā, I. xxvi.

वितसपवादि शस्त्रमाङ वेतसमित्यादि वेतसं वेतसपवं नामशस्त्रं सिरादीनां व्यथन कसंबि-योज्यं। वेतसपद्भगद्दनारत्वासस्य वेतसं वेतसपत्नं वेत्ति संज्ञा।

Vägbhatärtha Kaumūdī, I. xxvi.

विक्रमिति विक्रमतुन्त्यं विक्रियं सन्साविधनीसाष्ट्रः । तत तत्तान्त्रः :— विक्रिये चापि कर्मं व्ये प्रसाची तु पडकृती । स्वानतन्तु तयोरिकनिकं नात्यायतं भवेत । Suśruta says¹: The end of the hook is sharply edged and is said to have resembled the new leaf of Java (Hordeum vulgare).

It is recommended by Suśruta² to be used for extraction of foreign bodies, e.g., the extraction of stone from the urethra. Its use is also mentioned for transfixing the membranous expansion in the operation for pterygium³ and for fixing and dragging the uvula and tonsil before the performance of any operation on these parts⁴. Cakradatta⁵ mentions its use for fixing a growth, before its excision by the knife.

भर्तापचाहुलं इनं प्रेषं कार्यं मुखं तयो:। भर्वचन्द्राकृति वकः कार्यः नात्वानतमा तु। स्वानतः नामयेत् तत विश्वचिभिषस्वरः। इनाययोरनारं मादि यावदर्वाहालः मतः।

Nivandha Samgraha, I. viii.

विक्रीदनगढुयानतारे तीकाकस्टक प्रथमयवपतसुरी ।

Suśruta Samhitā, I, viii.

यहच्छ्या वा मुचमार्गप्रतिपद्रामनारासको ग्रकाग्रमरी कर्करा वा स्रोतसा अपहरेत्
 एवं चागको विदार्थ वा नाडों शस्त्रेण विद्योगीवरित ।

Suirutā Samhitā, IV. vii.

ग्रहणेयश्चिकाकादिवृद्धिः सुनताननः ॥

Aşţānga Hrdaya Samhitā, I. xxvi

विक्रियस्थमाह यहंगे इत्यादि सुष्ठु नतं श्रङ्ग्यवत् नसकतं श्राननं सुखं यस्य स तथाविधः सुनताननः विक्रिं मत्स्वविधनवत् विक्रियोनाम शस्त्रं स्पात्। स च युक्तिकास्मादिर्यहर्षे योज्यं। श्रादिपदिश उपजितिकादि परियहः।

Vägbhatartha Kaumūdī, I. xxvi.

पिङ्कामुत्तमाख्याच विद्योगोदुरिहिषक्।
 उद्ग्य मध्मयुक्ती: क्यायेरवच्चयित्॥

Suśruta Samhitä, IV. xxi.

उत्तमास्थानुपिड्कां संक्रिय विद्योद्याम्।

Cakradatta, Sukradoya Cikitsa.

It was also used for fixing any growth in the eye, previous to its excision by the mandalägra. For this purpose the Greeks used the vulsellum (myzon). Actius says: "If there is a large and malignant excrescence in the angle of the orbit, the enlarged part must be seized with vulsella and cut off."

Evidently vadisa was used on many occasions when in modern times we use the dissection forceps to steady a part before excision.

Vadiša is described in the Aśvavaidyaka³ to have been similarly used during the operation of pterygium in horses.

Pālakāpya⁴ mentions vadiša which is described as eight aŭguli long, the end being rounded like a wheel. It is to be used for raising the membranes of the eye globe.

Sharp hooks were used by the Greeks and Romans, for similar purposes. The use of the sharp hook for fixing the pterygium is mentioned by Celsus⁵, Aetius⁶, Paul⁷ and Albucasis⁸.

Its use in the excision of the tonsil is mentioned by Paul².

After the patient being placed in the proper position, he narrates: "We take a hook (tenaculum) and perforate the

Aśvavaidyka, XXX, v. 32,

विका चकायमणाङ्ख्यमाणमच्छी: पटलीखरनायं चेति ।

Palakāpya, III. xxx.

¹ See foot notes 1, 2 and 3, P. 227.

² Actius, vi. 74.

वितौ निपाल तुरगं ततोनेतं प्रसारयेत्। कतकसी भिष्मिदान् विद्योगाचिक्तां नि ॥

⁵ Celsus, VII. vii.

^{*} Actius. Tet. ii, iii, 60.

⁷ Paul, VI. xviii.

^{*} Albucasis. Chirrug, ii, 16.

Paul, VI. xxx.

tonsil with it, and drag it outwards as much as we can without drawing its membranes along with it, and then we cut it out by the root with the scalpel suited to the hand, called ancylotomus, for there are two such instruments, having opposite characters".

19. DANTA ŚANKU OR TOOTH-SCALER.

Its head is half an anguli long. It is quadrangular in shape and has a sharp edge. Suśruta ¹ describes the end as slightly bent, sharp and shaped like the fresh leaf of Java. Bhoja ² describes the end to be like that of the vrihimukha.

Vägbhaţa³ describes a similar instrument called dantalekhana or tooth-scaler. It is also quadrangular in shape, one side being sharp-edged and the opposite side little lengthened. It is

Nivandha Samgraha, I. viii.

एकधारं चतुक्कोचः प्रवडाक्रति चैकतः।
 इन्तिखनकः तेन शोधविह्नगर्करान्॥

Aştānga Hīdaya Samhitā, I. xxvi.

दनसेखन असमाइ एक धारमिखादि एका घारा यस्य तन् एकधार चतार: कीचा
यस्य तन् चतुष्कीणं कीणः कीणा इति यस्य प्रसिद्धिः तथा एकतः एकदीशान् प्रवहा वहनशीला
पाक्षतिः पाकारी यस्य तत्त्रथाविधं प्रवहाकृति दन्तसिखनं दन्तसिखनाखः अस्तं स्थान् तेन
दन्तसिखनाखीन असीण दन्तमकरान् दन्तनिवहान् अकराख्यान् सेखियेत् कश्चीदिन्धयः।
दन्तासिख्यने प्रनिति दन्तसिखनं दन्तमकरा पाधरि इति लोके।

See foot note 1, P. 265.

एवं हि क्रियते एती दशमकु विजानता। शहु वस मुखं तसा कार्यम दोहुलायतम्।। चतुरसं समदेव तीच्छधारं समाहितं। इत्तायं तसा क र्वत्यं शस्त्रं वीहिमुखाकति। क्यालिकां शक्रं राख दलस्थानेन शोधयेत्॥

recommended to be used for the extraction of sordes and tartar from the teeth 1.

The procedure of the operation of tooth-extraction is not described in detail in the medical books of the Hindus. But the operation seems to have been well known, for Suśruta distinctly advises the students to practise the operation of extraction on the fruits of Panas (Atrocarpus Integrifolia), Vimbī (Cephalandra Indica), Vilva (Ægle Marmelos) and on the teeth of the dead animals ². He also advises us to extract the wisdom teeth and to apply cautery to their sockets ³. Also when a tooth becomes loose he directs us to extract it and apply cautery to the socket ⁴. In the treatment of sinus caused by carious tooth, he advises us to extract the tooth, otherwise the sinus would extend down to the inferior maxillary bone ⁵.

शस्त्रेण दन्तवेदम दन्तम्लानि शोधयेत्।

पहिंसन् दलम्लानि गर्करासु ६ रेट मियक्।

Sušruta Samhitā, IV. xxii.

- See foot note 2, P. 280.
- चडुत्वाधिकदनान्तु ततोऽश्चिमवचारयित् ।
 क्षमिदनाक-वचापि विधिः कार्थ्यो विज्ञानता ॥

Suśruta Samhitā, IV. xxii,

* चलमुद्धत्य च स्थानं विदर्शक्षिरसा च।

Thid.

वन्दलमधिजायित नाङ्गी तंदलमुहरित्। किला मांसानि अस्तेण यदि नोपरिजीभयेत्॥ सोधयिला दहेडापि चारेण ज्ललनेन वा। भिनत्युपेचिते दले हनुकास्यि गतिधृष'॥ समूलं दणन' तस्याट्डरिट भग्नमस्यि च॥ उड्तेतृकरि दले समूले स्विरवस्तने॥ Pālakāpya¹ mentions the extraction of tooth of the elephant by means of enīpada which is an iron bar, thirty-two aŭguli long and equal to the tooth in circumference.

Paul says²: "The laminæ which unite to them (the teeth) we may remove as may appear proper, with the concave part of a specillum, a raspatory, or a file." The operation of tooth-extraction was however, not liked by the ancient Greeks as cases in which the operation proved fatal, occurred in their practice. Cælius Aurelianus, Herophilus, and Galen disapprove in general of the operation, except in extreme cases.

It would, no doubt, be interesting to know that in ancient India, the Hindus knew how to make false teeth to be used by men who have lost them either by accident or by extraction by the dentists. In 1194 A.D., Sahabuddin defeated Jayacandra in battle, "and the incident of the body of the raja being recognised by his false teeth³—a circumstance which throws some light on the state of manners" is well known.

20. ESANT OR SHARP PROBES.

"The probes", says Caraka *, "are of two kinds, the hard or

Pálakápya, HI. xviii.

धार्विश्रदशुलायतदशनपरिनाईन लीइद्रखेन। एनीपदेन कुथाँदुत्रस्य तयोः सम्यक्॥ बीहिसुलिन च परिशोध्य सर्वसस्य दलस्विषः उचादकधीतषु स्थुसपिः प्रस्य ददात्॥

² Paul. VI. xxviii.

^{*} Elphinstone's History of India, P. 365, 5th Ed.

^{*} विविधानेषणां विद्यान्सवीय कठिनामपि। चित्रदेस दुमिनां लेलीं हानां वा सलाकया॥ गभीरमां सगे देशे पार्वे लीइमलाकया। एष्यं विद्याद वर्णा नालेविपरीतमती मिषक॥

metallic probes, and the soft probes such as the young stems of plants. The hard probes are required for deep sinuses in the fleshy parts and the sides of the body, while the softer varieties are used for probing the superficial sinuses". The ends of the probes are generally shaped like the head of the earth-worms. Susruta² describes them to be eight anguli long. They are to be used as probes to ascertain the direction of sinuses. The blunt probes have been described before under the salākās.

The sharp probes have the shape of a needle and are six anguli long. The other end carries an eye through which is put one end of a caustic thread (i.e., thread soaked in caustic lotion and then dried). The probe is to be used for piercing the tissues through the blind end of the sinus. The end of the thread is next to be withdrawn from the eye of the probe and a tight knot applied with the other end. The intervening bridge of tissues is thus gradually cut and the sinus opened. If the cord be found inefficient for the purpose, a second thread is to be tied similarly.

Sušrnta Samhitā, I. viii.

तव नस्त्रभने पंखावष्टाहुने।

Ibid.

शतरनेषयी ज्ञा गण्यदमुखेषयी।

Aşţānga Hṛdya Samhitā, I. xxvi.

एषाक्यक्यं शस्त्रमाड गतेरित्यादि एषणीनाम शस्तं गते: नाडीवणसा प्रयादिपणसा पर्देषणी प्रश्वविचणी योज्यं। सा चैषनी इला। कोमलम्पर्शा, तथा गस्पुपदसुखा, महीलता सुखाकार सुखा च भवति।

Vagbhatartha Kaumūdī, I. xxvi.

पथ्यो गन्डपदाकारमुखी।

See page 155-7.

क्रमट्वंलभीरणां नाडीमकंशिताच या।
 चारम्बेण तां किन्यान तु मस्तेण इंदिमान्॥

This method of treatment is recommended for the weak and timid patients. The needle-shaped probe is also to be used in the extirpation of new growths by means of caustic threads. Cakradatta¹ also describes this operation; evidently he copies it from Suśruta. In the Yogaratnākara² the verses describing the operation are also quoted. Vāgbhaṭa also mentions a needle-shaped probe for the same purpose.³

In treating of fistula-in-ano, Paul quotes from Hippocrates and says 4:—"For Hippocrates directs us to pass a raw thread,

> एषस्या गतिमन्तिष्य चारन्वानुसारियोम् । मृचौँ निदश्वाद्वत्येने तयोद्यस्यायः निर्दर् ॥ मृचस्यानां समानीय गादवत्यं समाचरेत् । ततः चार वश्चं बौद्ध स्वमन्त्रत् प्रवेशयेत् ॥ चाराक्षं मितमान् वैद्यो यावत्रच्छिदाते गतिः । भगन्दरे प्रयोध विधिः कार्यः वैद्येन जानता ॥ ख्रुव्हादिसु चीत्रचिष्यं स्ले स्वं निधापयेत् । मृचौभियांववकाभिराचितं वा समन्ततः । मृखी भृवेष वश्चौयाच्छिते चीपचरेद्वषः ॥

> > Suśruta Samhitā, IV. xvii.

- These verses are quoted in the Cakradatta, Nădivrana Cikitsă.
- Also quoted in the Yogaratnakara, P. 346.
- मदनार्थेऽपरा म्चीमुखा म्लनिविष्टका।

Aştanga Hṛdaya Samhitā, I. xxvi.

चपरमध्येषचौ श्रश्नमाह । भेदनार्थे इत्यादि भेदनार्थे नाङ्गीत्रणानां गतिभेदनयं चपरा पूर्वोक्षाया एवन्छा चन्या मूचीमुखा स्चाकार मुखा सात् तथा मूले मूचदिशे निविष्टं, स्वनिवेश योग्यं खं किंद्रं यस्ताः सा मूलनिविष्टखा सच्छिद्रस्लमिल्ययः । चस्ता एयन्छामूले किंद्रकरचं चारकस्वनिवन्धनार्थे । तेन प्रभिन्न वारनिचाशितेन ढढ्वन्थेन चारस्वेण नाङ्गीत्रणः प्रकास्त्रते ।

Vägbhatärtha Kaumūdī, I. xxvi.

[·] Paul, VI Ixxviii.

consisting of five pieces, through the fistula by means of a probe having a perforation, or a double headed specillum; and to tie the ends of the thread and tighten it every day until the whole intermediate substance between the orifices be divided and the ligatute fall out". Hippocrates ¹ describes minutely the apolinose and recommends it for those who from timidity avoid a surgical operation. Celsus recommends the thread to be smeared with some escharotic ointment. The process, he says, is slow but free from pain². Albucasis ³ also approves of the operation according to circumstances. The operation called apolinose i.e., by the ligature, is very celebrated. Ambrose Pare, Foubert, Camper, Giudo de Cauliaco and Rogerius approve of the ligature. It has been recommended by some of the modern surgeons⁴. The operation is still practised in India by the Madrasi specialists for fistula-in-ano.

Vāgbhaṭa ⁹ describes copper probes having the sharp ends shaped like the buds of Kuravaka (Baleria Cristata) to be used in

तासी शलाका दिमुखा मुखे कुरवकाङ्गित:। लिङ नाम तथा विश्वेत्॥

Aştānga Hrdaya Samhitā. I. xxvi.

श्वाका ग्रस्तं भङ्गुलि ग्रस्तवाह तासीत्यादि विसुता, विवारा, सुनी, सुखप्रदेशे कुर्वका कृति:, रक्तिक्छीपुण सुकुलकारा, तासी, तासमधी, श्लाका, श्लाका ग्रस्तं स्थात्। तथ। श्लाकया लिङ्गनागं, कफीत्यं पटल संज्ञकं चच्चरीग विशेषं विध्येर्। विध्येदित्यमे न क्षेद:।

Hippocrates. 'De Fistulis'.

² Celsus, vii. 4.

³ Albucasis, Chirrug, fi, 80,

^{*} Lancet. vol. 1. 1845, new series.

the operation of cataract. Suśruta¹ describes such a probe to be eight anguli long, made of copper, or iron, or gold, the ends being shaped like buds. A thread is spirally twisted round the middle of the instrument for a length of a thumb's breadth, to afford a firm grasp by the surgeon's fingers. This instrument must not be rough, thick or very sharp, for then there would be a greater chance of the eye being injured more than is necessary and at many places. So also in couching of cataract, Celsus says: "Then a needle is to be applied, sharp so as to penetrate, but not too fine."

Pālakāpya ³ mentions eşanī in the surgical treatment of diseases of the elephants. He describes three probes,—smooth and shaped like the collyrium rods. They are recommended to be ten, twenty and thirty anguli long respectively.

> श्रमाका कर्कशायलं खरा दोषपरिवृतिं। अषं विश्रालं खुलामा तीका हिंसादनेकथा॥ जलाखावन्तु विश्रमा क्रियासङ्ग्रमधाखिरा। करोति वर्जिता दोषैसखादिभिहिता भवेत्॥ ष्टाङ्गुलायता मध्ये सुतेष परिवेष्टिता। षङ्गुष्ठ पर्वसमिता वज्जयोश्रांकुला क्रति:॥ तासायसी शातकीश्री श्रमाका सगदनिन्दिता।

> > Suśruta Samhitā, VI. xvii.

2 Celsus, VII. viii.

स्थिरा खडी च कर्त्तव्या त्रवानामियको भवेत्। त्रचा मञ्जूपदमुखी प्रमावे तिंत्रदाङ्गुली ॥ सुवर्षकप्यतामाखामायसी प्रज्ञजाऽपि वा। दन्तास्थिवनुदाक्षामियको दाक्षा भवेत्॥

Pālakāpya, 111. i.

एवणी दशाहुला विश्वहुला विश्वदृतुना ययायीगमधनशताकातत सुखतः प्रचा समा चैवनितास्त्रिस एवन्यः प्रमाणतः कार्याः । The operation of couching for cataract is essentially an Indian operation; and Suśruta describes the operation minutely as follows:—

The operation of couching for cataract.

Suśruta says¹: "Now we shall describe the treatment of cataract caused by phlegm. If inside the crystalline lens, anything is seen like a half-moon-shaped drop of water or pearl, hard, irregular

> श्रीभिके लिङ्गाशि त कसी बचामि सिहये। नचेदर्जेन्द्रचर्माम्ब्विन्द्रमुजाक्रतिः स्थिरः ॥ विषमी वा तनुर्गंध्ये राजिमाना वहुप्रभ: । दृष्टिस्यो लदाने दीय: सक्जा वा मुलीहित: ॥ चिम्धिसिद्रसा तसाय काले नाल्यभौतले। यनितस्योपविष्टसा सान्नासा प्रखतः सम ॥ मतिमान् ग्रक्तभागी दी क्रणाम् कालपाइतः। लक्षील्य नयने सम्यक् शिराजाल विवर्ज्जिते ॥ नाधी नीवंख पार्श्वामां किंद्री दैवलते तत:। प्रभाकता प्रवित्व विवस्तं वववक्षया ॥ मध्य प्रदेशिनाङ हस्विरहस राहीतवा। दिविशेन भिषक् सव्यं विध्येत् सब्येन चैतरत्॥ वारिविनदागमः सम्यक् भवेन्द्रव्यक्तवा व्यर्ध। मंसिका विज्ञमावना योषितस्त्रीन कोविद:॥ क्थिरे टीवे चले वापि स्व देयदेचि वाहात:। सन्यक प्रलाको संख्याच्यान्यक्षेर निलानाग्रनै:॥ ज्ञाकारीय त तती निर्मियेहिटमकलं। विध्यती बीड्य पार्वे ड्यासं बढा नासिकापटं ॥ चिक्रजनेन इसे व्यो हिएमन्डलन: कफ:। निरस इव घमांग्रयंदा हिट: प्रकाशते॥ तदासी लिखिता सम्यम् श्रेया याचापि निर्वेधा । तती इटेष क्षेष श्लाकामाइरेक्टनै: ॥

or thin, striated or shinning, painful or red, caused by the deranged humours, the oleaginous applications and fomentations are to be tried first at a time when it is neither hot nor cold; then he (patient) is to be ligatured after having him seated conveniently, and should be directed to look towards his own nose. The intelligent (surgeon), then seperating the white part from the black part and the external canthus of the eye after opening it, avoiding the vascular network, and leaving the parts above and below intact, is to pass a yavamukhī śalākā (or sharp needle having its end resembling a wheat) through a natural opening on the side, steadily holding the rod with the thumb, index and middle fingers. If the operation be required on the right eye, the left hand, and if on the left eye, the right hand of the surgeon should use the needle in puncturing. A successful puncture is known by the escape of a drop of fluid and an audible sound. The experienced surgeon is to sprinkle woman's milk just after the puncture, and keeping the needle there, whether the deranged humour be movable or not, should apply fomentations externally by means of oily remedies for the deranged air. The crystalline lens is next to be scarified by the sharp end of the needle. Then keeping the needle fixed in the side of the eye, the patient should be directed to sniff so as to destroy the phlegm of the lens. The proper scarification will be indicated when the lens appears brilliant as the sun uncovered by clouds. Then the vision being clear, the needle in the side of the eye, is to be removed; and the eye is to be well

> ष्टतेनाथच्य नयनं पस्तप्टेन वेडयेत्। ततो रहे निरावाधे शयौतोत्तान एव च॥

soaked with ghee (melted butter) and bandaged properly."

Vägbhaṭa also discribes the operation similarly.

To this we may compare the account of the operation as given by Celsus. He "lays it down as a rule, that when the suffusion is small, immovable, and of the colour of sea water, or of shinning iron, and if a small degree of light can be percieved at the side, there is reason to hope well of the case. He forbids us to operate until the disease has attained a proper consistence. He directs us to place the patient opposite the operator, who is to sit on a higher seat, while the patient's head

चय साधारणे काले यहमंभीजिताकानः। देशे प्रकाशे पृथ्वांक्षे भिषम् जानुच पीठम:॥ यान्वितस्रोपविष्टस्य सिन्नाचसा मुसानिलै:। षह ट सदिते नेवे हटी हडीत्यतं मलम् ॥ सनासां प्रेचमाणस्य निष्तम्यं मुप्तिं धारिति। कषादबांह लं मुका तदबांबेमपाइत: ॥ तर्जनीमध्यमाङ्ग्हेः शलाकां नियलं धृताम्। दैविच्चद्रं नयेत् पावाद्वंमामस्ययद्विव ॥ सबं दिवाइसीन नेतं सब्येन चेतरत। विध्येत् सुवित्रे शब्द: स्यादकक चाम्बलवस्त्रत:॥ मान्वयद्मातुरं चानु नेवं क्तन्येन सेच्येत । मनाकायासतीऽयेग निर्सिखेन्ने वस्तरासं ॥ चवाधमानः शनकैनांसां प्रतिनृदंशतः। उक्किश्वनाशापहरेट् इटिमञ्जूनमं कफम्। सिर दीये चल चापि स्व दयेदचिवाहात: ॥ वय इप्टेष क्षेष मलाकामाहरेक्कनै:। प्रताप्रतं पिनु दस्ता वहासं शाययेत्रतः ॥ विहादनीन पावन तमुत्तानं हयीर्यध । निवाते अयनेऽभ्यक्तियरः पादं हितरतम् ॥

is held by an assistant. The sound eye is to be previously covered up with wool. If the left eye is affected, the operator must use his right hand, and vice versa. A needle which is sharp and not too slender is to be passed direct through the two coats at a place intermediate between the temporal angle and the black of the eye, and towards the middle of the cataract. When the needle has perforated far enough, which is readily known by the abscence of resistance, it is to be turned so as gradually to remove the cataract below the region of the pupil and this object being attained it is to be strongly pressed to the lower part. If it remain there the operation is completed, but if it return, it is to be cut and torn by the needle into many pieces, in which state they are easier depressed, and prove less troublesome. The needle is then to be drawn out direct and soft wool smeared with white of an egg, and other antiinflammatory applications are to be used. Quiet, restricted diet, and soothing treatment will be proper, 1" Paul 2, Mesue 3, Albucasis 4, Rhazes 5 and others also describe the operation of couching in similar terms. Albucasis gives figures of these needles.

The operation is still practised in India by the mals who consider themselves specialists in diseases of the eyes.

21. SARPĀSYA.

Vägbhaţa describes an instrument having its end resembling

¹ Celsus, vi. See Adam's Commentary to Paul VI. xxi.

³ Paul. VI. xxi.

^{*} Mesne. De Aegr. oculi, 15.

^{*} Albucasis. Chirrug, Il. 23, * Rhazes. Ad mansor.

the mouth of a snake ¹. The blade is said to be half an anguli long. It is advised to be used for excision of the nasal and aural polypi.

The fact that it was able to work inside the nose and the auditory canal shows that it could not have been of any great breadth, possibly less than a quarter of an inch at the most. The exact shape of the sarpāsya can not be determined with certainty. The Greeks however used for the same purpose, "a polypus scalpel, having its extremity shaped like a myrtle leaf," which was a double instrument, the other end being a scoop?

GOLD OR SILVER KNIFE.

To cut the navel cord, Caraka ³ recommends the use of a knife, made of gold, or silver, or iron. To make gold and silver knives of sharp edges seems absonous to our reason, but we must remember that to cut the navel cord, a very keen edge is not required, and even now the purpose is often served by the native dhāis with a piece of split bamboo.

मपांसा भागकवार्शक्वेदनेऽशाङ्गलं फंले॥

Aştanga Hrdaya Samhitä. I. xxvi.

सर्पांसं नाम गस्त्रमाह । सर्पांसं इत्यादि सपास नाम गस्तं नासिका कर्णांगंसा हिदने योज्यं तद्य फले बहुलार्डपरिमितं बडाहुलपरिमित फलकमित्ययं:। बसा सर्पेमुखसहग सखलात सर्पांसामिति संज्ञा।

Vagbhațărtha Kaumūdi. I. xxvi.

² Paul, VI. xxv.

³ See foot-note 4. P. 65.

PRATUDA.

Susruta mentions it as a knife to be used for making scarifications on the body of a lunatic.

The mode of holding the sharp instruments.

Susruta says 2: "The vriddhipatra is to be held at the junction of the handle and the blade; and all instruments used for incision should be held similarly. The vriddhipatra and mandalāgra, if used for scarification, should be held with the hand raised a little; when used for evacuating abscesses, they, as well as all other instruments, should be held by the fore part of the handle. But in the case of children, old or delicate or timid persons, women, and kings and princes, abscesses should be evacuated with the trikūrecaka. The vrihimukha is to be held with the thumb and forefinger, its handle being covered within the palm. The kuṭhārikā is to be held in position with the left hand, and struck with the middle finger when let go forcibly from the under surface of the thumb of the right hand. The ārā, karapatra and eṣaṇī should be held at their extremities.

प्रतृदैदारियत्थेन मध्येषात विवर्णयत्। सप्तिथाने जरत्कृपे सतत वा निवासयत्॥

Suśruta Samhitā, VI. liii.

तैषामययोग यहण समासीपाय: कर्ष्मस वत्त्यते। तत इित्रच इनफलसाधारणे भागे ग्रह्मीयादेदनान्येव स्थ्याणि। इित्रच मण्डलायच किचिद्नानपाणिना लेखने वहुमोऽवचार्थं इन्तार्थे विस्तावणानि। विश्रिषेण वालक्ष्यसुक्रमार भीव नारीणां राज्ञां राज्ञपुवाणाच तिकूर्यकेन विस्तावयत्। तल प्रच्छादित इन्तमहुष्ठ प्रदेशिनीभ्यां श्रीहिसुखं। कुठारिकां वामहस्तवसामित-रहस मध्यमाहुल्याहुष्ठ विष्ठव्ययाभिह्नात्। चाराकरप्रवेषय्वो सूली। श्रीषाणि तु यथायीगं ग्रहीयात्।

The other instruments are to be held as required in particular cases." Vāgbhata also gives similar directions 1.

The practical training in surgical operations.

Suśruta says ²: "Even after a pupil has mastered the whole of the medical treatises, the preceptor should instruct him practically how to perform surgical operations and how to administer oils and other medicines. However learned he may be in books, he cannot be fit for surgical practice, unless he has acquired the practical training. Therefore the preceptor should show his pupils the methods of operations, of incision, excision and division, upwards and downwards on the pumpkin, bottle-gourds, water-melons, and the three varieties of cucumbers—Trapuṣa (Cucumis Sativus), Ervārūka (Cucumis Utillissimus), and Karkarūka (Cucumis Melo).

> क्टि मेट्रेन लेखायं मसं उन फलानरे। तर्ज्यनी मध्याङ्ग्टेर्ट बीधान् सुसमाहित:। विस्नावणादि उनाये तर्ज्यन्यङ्ग्ठके न च। तम प्रकृत उनायं याद्यं ब्रीहिसुखं सुखि। सुलेखाइरणायांनि क्रिया सीक्यंतोऽपरं॥

> > Astānga Hṛdaya Samhitā. I. xxvi.

श्रीधात स्वंशास्त्राधिमिप शिष्यं योग्याङारयेत्। दियादिषु सेशादिषु च कर्षपयमुप-दिशित्। स्वकृत्रतीयक्रत योग्यः कर्षस्ययोग्यो भवति। तत प्रपण्णलालाव् कालिन्दक-त्रप्रीव्यंक्तककार्वक प्रस्तिषु दिया विशेषान् दर्शयेद्रत्कर्षनपरिकर्षनानि चोपदिशित्। हित वस्ति प्रसेवक प्रस्तिष्दकपङ पूर्णेषु नेदा योग्यो। सरोसि चर्चाग्यातते लिख्यः। स्त प्रशास्त्रास्त्रप्रलालोषुच विश्वयः। स्वाप्तिक्तित्वप्रलालावसुखेष्वेष्यः। प्रमाविक्वीविक्वप्रलम्ब्यस्तप्रयद्नोष्याङ्गर्थयः। मध्बिद्योपलिने शावलीपलिके विसाव्ययः। स्वाप्तवस्त्रान्ययोगं द्वमानयोग्यं सीव्यसः। प्रसम्य प्रस्थाङ्गरवङ विशेषेषु वस्त्रयोग्याः। सद्मासप्रशाद्यत्वक्तानयोग्यं सीव्यस्त्राच्याः। सद्मु मास्यस्त्रेष्विप्रचारयोग्याः। सद्मु मास्यस्थेष्विप्रचारयोग्याः। सद्मु सास्यस्थेष्विप्रचारयोग्याः। सद्मु मास्यस्थेष्विप्रचारयोग्याः। स्वप्रचार्याः। स्वप्रचार्यः। स्वप्रचार्याः। स्वप्रचार्याः। स्वप्रचार्याः। स्वप्याः। स्वप्यायः। स्वप्रचार्यः। स्वप्रचार्याः। स्वप्रचार्याः। स्वप्

The operation of puncturing or tapping may be demonstrated on leather bags, bladders and pouches, filled with slush; scarifications, on stretched pieces of leather covered with hair : opening on the veins of dead animals or on stalks of water-lily; probing on worm-eaten wood, bamboo, reed, tube or dried bottle-gourd; extraction, on the pulp of jack fruit, the Bael fruit (Ægle Marmelos), Vimbī fruit (Cephalandra Indica) or on the teeth of dead animals. Evacuation on a lump of wax applied to a board of Salmali wood (Bombax Malabaricum); sewing, on the two ends of a thick piece of cloth or soft leather; bandaging on the limbs of a dummy (human figure made of cloth and clay), bandaging the root of the ear, on a piece of soft flesh, or the stalk of a water-lily; application of cauteries, on pieces of flesh; introduction of tubes for clysters (urethral, rectal and vaginal) and wound-syringe, on the spout of an earthen vessel filled with water, or on the mouth of a bottle-gourd or similar objects."

CHAPTER VII.

THE ANUSASTRA.

The anusastra means substitutes for cutting instruments.

They are the following 1:—

Bamboo. 2. crystal. 3. glass. 4. ruby. 5. leeches. 6. fire.
 caustics. 8. the nails. 9. leaves of Goji (Elephantobus Scaber), 10. Śephālikā (Nyctanthe Arbortristris), and 11. Śākhā (Tectona Grandis). 12. young stems of plants. 13. hair
 finger.

These are advised to be used in case of infants or timid persons or when the proper instruments are not available.²

1. Вамвоо.

A piece of split bamboo is said to have been used for cutting through and cutting into some parts of the body. It is still used by the native dhais or midwives for cutting the funis.

A piece of bamboo is directed to be used for applying pressure on small boils to cure them by subsidence ³. For the same purpose, the pressure of the thumb is also recommended ⁴.

Thid.

Ibid. IV. aviii.

पुत्रम्माचि तु लक्सारस्प्रिककाचकुर्यतिन्द्रजलीकाग्निचारनखगोजीशेकालिका-श्राकपत करीरवालाङ्गलय दित । Subrata Samhita, L viii.

श्रियनां शस्त्रभीक्षां शस्त्राभावे च योजयेत्। लकसारादि चतुर्लमं हिये भेये च इहिमान्॥

इतेषु दोषेषु यथानुपूर्वे गयी भिषक् श्रीम समुख्यित तु ॥
 स्वित्रस्य विस्तापनमेव कुर्यादङ्गुङलोडीपलवेख दस्है:।

चथा सेदियला च विचनाद्या ततः मनैः।
 विकापनार्थं सद्रीयात् तलिनाङ्गुष्ठकेन वा ॥

Bamboo is also mentioned to have supplied largely the materials of splints for treatment of fractures and dislocations. For this purpose it is to be split into thin layers. Split bamboo is still used for the treatment of fractures by the kavirajes and might advantageously be used by the modern surgeons as a cheap and easily available material for splint.

Dissection.

It is generally supposed that the practice of dissection of the human body for anatomical studies was unknown to the ancients. But the practice of human dissection is unmistakably referred to in the Suśruta Samhitā. Brushes made of bamboo, barks of trees, grass roots, and hairs are mentioned as instruments of dissection. "Thus a body should be secured which is complete in all the parts and which is of a person who was not more than 100 years old, nor who died from the effects of poison or of a chronic disease. Having cleared the intestines of any fæcal matter, the body should be well wrapped either in Muñja (Saccharam Munja), or grass, or barks of trees or hemp etc., put inside a cage which should be firmly fastened, in a solitary spot, in a calm river and thus allowed to decompose. After seven nights, having taken out

विभग्नच नरं हहा विश्वख्यं न वस्त्रयेत् ।
 स्वयंत्रवनीतनैरख्यवय वेष्ट्येत् ॥

Hārita Samhitā, II.I lvi.

Susruta Samhita, III. v.

[ै] तस्मान्समस्मावसिविषेपहतसदीर्घेव्याधिपीड़ितसवर्षशितकं निःस्ष्टान्सपुरीषं पुरुषस-बहन्यासापगायां निवडं पद्धरस्यं सुखवल्कलकुश्रश्यादीनासन्यतसेनाविष्टिताङ्कसप्रकाशे देशे कोषयेत् सस्यक् प्रकुथितचीबृत्य ततो देहं सप्तराचादुशीर वालवेख बल्कल कृचीनासन्यतसेन शनै; शनैरवघर्षयं स्वगादीन् सर्व्यनिव वाद्याध्यनराङ्गप्रत्यङ्ग विशेषान् बयोक्तान् सच्येचच्छा।

the thoroughly decomposed body, it should be slowly rubbed with a brush made either of Uṣīra (Andropagon Muricatus) or hair, or bamboo, or barks of trees, examining at the same time with the eyes, every division and sub-division of the body, external or internal, beginning with the skin, as delineated in the śāstras." Animal anatomy was also thoroughly understood as each part of the body had its own distinctive name.

Hoernle¹ says: "Probably it will come as a surprise to many as it did to myself, to discover the amount of anatomical knowledge which is disclosed in the works of the earliest medical writers of India. Its extent and accuracy are surprising, when we allow for their early age—probably the sixth century before Christ—and their peculiar methods of definition.***Of the practice of such dissection in ancient India we have direct proof in the medical compendium of Susruta, and it is indirectly confirmed by the statements of Caraka. It is worthy of note, however, that in the writings of neither of these two oldest Indian medical writers is there any indication of the practice of animal dissection."

The Greeks did not practise disection of the human body.

"The anatomical knowledge of the Hippocratists was derive chiefly from dismemberment of animals, experience in slaughtering and sacrifices, and from the observation of surgical cases. Systematic dissection of the human body was out of the question owing to the religious precepts which strictly enjoined immediate burial, and to the superstitious horror of the dead which then prevailed. The supposition that outstanding individual investigators, upon rare occasions, did not hesitate to examine

¹ Hoernle, Osteology, Preface, iii-

human bodies or parts of bodies (particularly) bones, in order to correct prevailing opinions, is one which, if not susceptible of direct proof, is at least probable. This supposition, besides being borne out by many statements on the part of ancient writers, is the more probable since tho bodies of savages, traitors and criminals were outside the pale of religious ordinances and were therefore available, as were also accidentally obtained portions of the body, to satisfy the curiosity of scientific investigators. No one of the oft-quoted extracts from the Hippocratic writings, supposed by individual historians to refer to human dissection, is quite conclusive, whilst nowhere is there in the pathology of the day any definite trace of anatomical research upon the bodies of those dead of disease. On the other hand comparisons are frequently instituted by the Hyppocratists referring to facts acquired through zootomy or to anatomico-pathological discoveries such as might have been made in the slaughtering of beasts."1

The study of anatomy received its impetus from the Alexandrian School. "Herophiilus improved the technique and developed the terminology of anatomy and enriched it by valuable discoveries made in the dessection of human bodies, particularly in the knowledge of nerves, vessels and viscera, but also in that of the eye. With his works, systematic anatomical investigation may in fact be said to begin." 2

"Like Herophilus, Erasistratos made a successful study of anatomy, even surpassing the former in knowledge of details, and in a series of observations upon the cadavers of men and

¹ History of Medicine. Neuberger. P. 150.

¹ Ibid. P. 177-8.

animals, corrected his own mistakes as well as those of others. His greatest achievement was in the study of nerves and vessels."

2, 3 and 4. Crystal, glass and ruby.

These are recommended to be used for cutting through and cutting into some parts of the body.

Glass vessels for preparing medicines are often mentioned. Śārngadhara² used it for purifying mercury.

5. LEECHES.

Leeches are described to be the mildest of all means for extracting blood, and are recommended for princes, childern, women, and timid people³.

Twelve kinds of leeches are described; six of them are poisonous and six, non-poisonous.

काचकृष्यो विनिचिष्य ताच सदस्तसुद्रया।
विलिष्य परितो वक्तं सुद्रां दल्लाच श्रीषयेत्॥

Särngadhara Samgraha, II. xii.

ै चृपा शवालस्यविर भीकटुर्व्वलनारी सुकुभाराणामनुग्रहावै परमसुकुमारोऽर्य शोणितावसी च नोपायोऽभिहितो जलीकसः ॥

Suśruta Samhitä, L xiii.

े जलमासामायुरिति जलायुका जनमासामीक इति जलीकसः। ता राद्य तासां सविधाः
स्ट्तावत्य एव निर्व्विधाः। तत सविधाः क्षणा कर्णुरा चलगादां इन्द्रायुधा सामुद्रिका
गोचन्द्रना चेति। तास्त्रजनचूर्णवर्षा पृथुशिराः कथा। विद्यंभन्त्यवद्याता विद्योद्यतः
क्रिचिः कर्णुरा। रोमशा सद्दापायां क्रथमुख्यलगदी। इन्द्रायुधवद्द्रश्राजिभिधितिता
इन्द्रायुधा। इंधदिसतपीतिका विधित प्रथाक्षतिचिता सामुद्रिका। गोवधबवदधीभागि
विधामृताक्रतिरणुसुखी गोचन्दनेति। ताभिष्टंदे पुरुषे दंशे वयसुर्तिमातं कर्णुमुक्कां

¹ History of Medicine. Neuberger. P. 181.

The poisonous leeches are :-

 Kṛṣṇā:—it is of the colour of black collyrium and has a broad head.

ज्वरीदाहर्ष्टाईमंदः सदनमितिलिङ्गानि भवनि । तत्र महागदः पानालेपननसः कर्यादियूप-योजः । दन्द्रागुषादष्टमसाध्यमित्येताः सविषाः सचिकित्सिता व्याख्याताः । षय निर्व्विषाः । कपिला पिङ्गला शङ्मुखी सूषिका पुखरीकमुखी सावरिकाचेति । तत्र मनःशिलारिङ्गता-भ्यामिव पार्थाम्या पृत्ते खिन्धसृद्धवर्षां कपिला । किचिद्रका इत्तकाया पिङ्गाग्रगाच पिङ्गला । यक्तदर्षां श्रीप्रपायिनी दीर्धतीकामुखी शङ्मुखी । सूषिकाङ्गति वर्षाऽनिष्टगन्या च सूषिका । सहदर्षां पुखरोकतुल्खवङ्गा पुखरीकमुखी । द्विन्धा पद्मपत्ववर्षां प्रायत्ववर्षामाणा सावरिका साच पद्मर्थे । द्वत्येता चिवश व्याख्याताः ।

तासां प्रयहसमार्द्रचर्मभानीका प्रयोगेर्थं हीयात्। भवेनां नवे महति घटे सरसङ्ग् गोदकपढमावाष्य निद्ध्यात्। भत्यार्थे चासासूपहरेक्वेवलं बहुरमीदकाय करदा-यूर्षीकत्य मध्यार्थे ढसमीदकानि च पवाशि। द्राहान्नाहासान्यक्रलं भत्यस्य द्यात्। सप्तरावात् सत्रादास घटमन्यं संक्रामयेत्। भवित चात्र।

> स्यूलमध्याः परिक्रिटाः पृथ्यो मन्द्विचेटिताः । षयाहिस्कोऽत्यपायिनः सविवास न पूजिताः ॥

षय जलीकोऽवसेकसाध्यव्याधितसृपवेद्य संवेद्य वा विक्त्य चास्य तमवकार्य सङ्गोसयवृष्यंद्यक्तः सात्। रहीताय ताः सर्पपरजनीकल्कोदक प्रदिश्यगतोः सलिलसरकमध्ये
सृष्ट्रमंस्थिताविगतक्षमा ज्ञाला तामीरोगं याद्यत्। मृद्ययक्षादंपिनुज्ञीतावस्त्रमं क्षला
सखनपावस्यादरहानये चौरविन्दुं शोषितविन्दुं वा दयास्थ्यपदानि वा कुर्वीत ययेवमपि न
गरक्षोयानदान्यां याद्यत्। यदा च निविमतेऽवमुरवदाननं क्रलोक्षय च स्कन्यं तदा
जानीयाद रहातीति रहम्मां चाद्रवस्त्रावस्त्रमं धारयेत् सेचयेषः। दंशे तोदकल्दुपादमांवैक्यांनीयास्त्रद्वस्त्रमादत्त द्रति ग्रवमाददानामपनयेत्। स्थ ग्रोषितगत्र्येन न सुन्देनसुखनस्यः
स्थावन्युर्णनावकिरत्। स्थ पतितां तस्त्रुष्यकस्यनप्रदिश्यगावीं तैष्यखवस्यामक्रसुर्खी वामइस्ताङ्गाङ्गानोकिरत्। स्थ पतितां तस्त्रुष्यकस्यनप्रदिश्यगावीं तैष्यखवस्यामक्रसुर्खी वामइस्ताङ्गाङ्गानोभां ररहीतपुत्कां दिचयह्माङ्गाङ्गाङ्गाङ्गीतः। मन्द्रस्याना सिष्यस्यन्यान्। भोजुकामा सती
चरेत्। या सीदित न चेष्टते सा दुष्यांना ता प्रनः सम्यवामयेत्। दुष्यांनाया व्याधिरसाध्यद्रस्यदे नाम भवति। स्थ सुवनां पूर्ववत् सिद्ययात् शोषितस्य च योगायोगानवेद्या
जलीकोवणात्रभुनावपद्यीन्दीतामिरद्विय परिवेचयेवज्ञीत वा व्रणं काषात्र सपुर सिर्वभातियः
प्रदेषैः प्रदिखादिति।

- Karvūrā:—it is as long as an eel with elevated stripes across the abdomen.
- Alagarddā:—it looks as if covered with hair and has large sides and black mouths.
- Indrāyudhā:—or rain-bow coloured; it has rain-bow coloured longitudinal stripes on the back.
- Sāmudrikā:—it is of dark yellow colour and has variegated flower like spots on its body.
- Gocandanā:—it has a bifurcated tail like the serotum of a bull and a small mouth.

The non-poisonous ones are-

- Kapilā or the greenish one;—it has its two sides of the colour of orpiment, and on its back, it is smooth and of the colour of a green pea.
- 2. Pingalā or twany;—it is of a reddish-brown colour, has a round body and moves quickly.
- Śańku-mukhī or bluish-red;—it is of the colour of the liver, sucks quickly and has a long sharp mouth.
- Mūṣikā or rat-like;—it has the shape and colour of a rat's tail and emits a disagreeable smell.
- Pundarika-mukhi or lotus-faced;—it is of the colour of a green pea and has a mouth liks a lotus.
- Savarikă;—it is slimy, coloured green like a lotusleaf and eight angulil long; it is to be used in veterinary practice.

The non-poisenous leeches generally live in meadows and fresh water. They are to be caught with a piece of wet leather and kept in a new large earthen pot filled with mud, water, green fungi, dry flesh, etc. The water is to be changed every third day and the pot every seventh day.

To apply leeches, the patient is directed to lie down and the part is to be rubbed dry with powdered cow dung and earth. The leech is then to be smeared with a paste containing turmeric, mustard and water, to excite them, washed thoroughly with water and then applied, its body being covered with a piece of wet cloth. To fix it quickly, a drop of milk or blood is to be applied over the diseased part, scarification of which is also recommended instead. When the leech has removed the necessary quantity of blood, a small quantity of salt is advised to be sprinkled upon its head to make it drop off. Then the leech is to be put upon some powdered rice and its mouth is advised to be smeared with oil and salt.

Then it is to be stripped and put in fresh water, and should be used again, if it moved, but if languid, thrown away.

The leech-bites are to be smeared with honey, cold water and astringent substances, or poulticed.

Vāgbhaṭa also gives similar directions for the application of leeches.¹

जलीकसन् सुखिनां रक्तसावाय योजयेत्। टुष्टाम्बुसत्सा सेकाडि शवकोषमलीहवाः। रक्ताः चेता स्त्रं क्तपायपलाः स्यूलपिक्तिलाः॥ इन्दायुधविधिबोर्दुराजयी रीमयाय ताः। स्विषा वर्जयेत्ताभिः कल्युपाक ज्वरसमाः॥ विषपित्तासनृत् कार्यं तव ग्रहाम्बुजाः पुनः। निर्विषाः शेवलस्यावा हता नीलदेराजयः॥

Dr. Ray has clearly shown that "the discription of leeches as given by Rhazes agrees almost word for word with that of Suśruta (Sanasrad) in many places". He describes the parallelism at length and comes to the conclusion "of the use of a chapter of the Susruta or some such work!".

6 AND 7. FIRE AND CAUSTICS.

The use of cauteries in surgery has been described before under the head of the accessory blunt instuments ?.

> कषाय प्रशासन्बद्धाः किञ्चित पीतदराय याः॥ ता चयमस्यम् वमनात् प्रवतच निपातनात्। सीदनी: समिलं प्राप्य रक्तमत्ता इति व्यजित् ॥ भयेतरा निशासक युत्ते उचासि परिप्रता:। भवित्तसीमें तकेवा पनवायासिता जले॥ लागयेद इतसत्साङ शस्त्र रत्त निपातने:। पिवनीयब्रहत कासान्हादयम्बदवाससा ॥ संप्रताह ए ग्रह्माञ्चलीका दृष्टभोशितम्। बादते प्रथमं इंस: चीरं चीरोदकादिव ॥ दंशस तीरी करड़ों वा मीचधेवामधेव ताम। पटतेलाजबदनां युक्ता कन्छन कविताम ॥ रचन रक्तमदाद सुय: सप्ताई वा न पातयित्। पुळेवत पटता दार्ध सम्यग् वानी अशोकसाम । क्रमीऽतियोगाचान्युवी दुव्वीनी सत्थता मदः॥ धनतानव ताः स्वाया घटे सत्सामगर्भिन। नानादिकीय नामार्थं सविषाः सुम्तदनवात्॥ चग्रती साववेदंगान एरिट्रा ग्डमाचिके:। शतधीताञ्चपिचवसती लेपाय शीतलाः ॥

> > Aştanga Hrdaya Samhita, I. xxvi.

¹ History of Hindu Chemistry, Introduction P. laviii.

See Page 213-9,

8 AND 14, FINGERS AND NAILS.

The uses of surgeon's fingers and nails in surgical operations has been described before¹.

9,10 AND 11. LEAVES.

Rough leaves such as those of Fig trees (Fieus Indieus), Goji (Elephantopus Scaber), Śephālikā (Nyctanthes Arbor-tristis) and Śaka (Tectonia Grandis) are recommended for scarifying abscesses if they do not heal up after repeated opening by the knife. If there is any formation of pus in the mouth or eyelids, it may be evacuated with these leaves (Susruta)². These leaves are also to be used for bleeding the gums in gingivitis.

To cover the wounds, Susruta gives a list of leaves to be used according to the nature of the wound and season of the year³:—

For air-deranged wounds;—use leaves of Eranda (Ricinus Communis), Bhūrjapatra (Betula Bhojpatra), Pūtika (Caesalpinia Bonducella) and Haridrā (Curcuma Longa).

मंशोध्यीभवतः कार्णं शिरवीप कृति तथा।
 काकोडम्बरिका गीजीपवैदिश्वावयदस्य ॥

Suśrutā Samhitā, IV. xxii.

परस्य भूज्यपूरीक हरिद्राणान्त वातने। प्रथमाववलं यस कारमरी प्रतमिव च ॥ प्रताणि चौरहचाणामीदकानि तथेव च। दूषिते रक्तपित्तास्यां ज्ञणी द्यादिचचणाः॥ पाठामूळ्यांगृङ्गुचीनां काकमाचीहरिद्रशीः। प्रतस्य ग्रकनाणाया योजयेत् कफ्जे ज्ञले॥

See Page 199-202, and 204-5.

For bile or blood-deranged wounds;—use leaves of Aśvabala (Basella Rubra), Kāśmarīpatra, (Gmelina Arborea), Vata (Ficus Bengalensis) and Kumuda (Nymphae Lotus).

For phlegm-deranged wounds—use leaves of Pāṭhā (Cisamphelos Hexandra), Mūrvā (Sansevieria Zeylanica), Guḍueĭ (Tinospora Cordifolia), Kākamācī (Solanum Nigrum), Haridrā (Curcuma Longa) and Śuknāśā (Oroxylum Indicum).

For similar purpose Caraka¹ recommends us to use the leaves of Kadamva (Anthocephalus Cadamba), Arjuna (Terminalia Arjuna), Nimva (Azadirachta Indica), Pătalī, Pippala (Ficus Religiosa) and Arka (Calotropis Gigantea).

The leaves of the padma or nymphæ are to be used for handling the eyeballs and the intestines, to replace them in their proper position when prolapsed by injury² (Suśruta) Caraka recommends lotus leaves and plantain leaves as coverings to the bleeding piles,³ Cakradatta⁴ mentions the use of

> कद्वार्जुननिकानां पाटलाः पिपलस्य च। त्रण प्राच्हादने विदान् पतास्क्रम्य चादिशेत् ॥

> > Caraka Samhita, VI. xiii.

भिन्नं नेतमकसंख्यमभिन्नं लस्तते तु यत् । तन्निवेश्य यथास्यानमन्यावित्रभित्रं मने: । पौक्येत् पाणिना सन्यक् पद्मपतान्तरेण तु ॥

Suśruta Samhitā, IV. ii.

कदलीदलेरभिनवै: पुष्कर प्रवेश शीतजलिसकौ:।
 प्रच्छादनं सुहर्श्यहरिटं प्रधीतपलदलेश ॥

Caraka Samhita, VI. ix.

गोजीशिकालिका प्रतेरग्रं: संलिख्य खेपयित्।
 चारेग वाक्शतं तिष्ठेड् यन्त्रदारं पिधाय च॥

Cakradatta, Arsa Cikitsa.

Gojī and Šephālikā leaves for scratching the piles before the application of caustics to them. He also directs us to rub the small tumours with the rough leaves before the application of various ointments. Sivodāsa also mentions the use of such leaves for rubbing the eyelids in the pillva disease. Susruta mentions the use of rough leaves for scratching any part.

Paul⁴ mentions the use of fig leaves, for rubbing down the hard granulations of granular lids.

12. Young stems of plants.

The young shoots are described to have served the purpose of a probe. Caraka⁵ calls them the soft variety, the metallic ones being called the hard probes. These shoots are to be used for superficial sinuses. Susruta directs us to use the young shoots

> विष्ण चोडुक्सरशाकगोजी-पतेभृत्र' चौद्रयुतै: प्रक्रिभेत्।

> > Cakradatta, Granthyarvuda Cikitsä.

वर्कावलेख' वहुशसदच्चीचितमीचणम् ।
 पुन: पुनर्विदेकच पिलरोगातुरो भजित् ॥

Cakradatta, Netraroga Cikitañ.

वलांबलेखिमिति । कर्कग्राखोटकादि परेण वरमेंघर्षणम्।

Tattva Candrika, Ibid.

चीमं ब्रीतं पितुं फिनं यावय्वं ससैस्वं।
 कर्कशानि च पतािश लेखनार्थे प्रदापयेत्॥

Suśruta Samhitä, IV, i.

[·] Paul, III, xxii.

^{*} See foot-note 4. P. 269.

of the pot-herbs called Cuñca and Upādikā (Basella Rubra) as probes in sinuses on the eyelids and arround the anus.

If in young people the teeth become loose as the result of some injury, the patient should be directed to live upon milk only, sucking it through the stalk of hily; and thus affording the teeth rest and a chance of being firmly fixed again.²

To excite emesis, Śārṅgadhara, and advises us to introduce a tube of Eraṇda (Ricinus Communis) into the throat of the patient. The vomiting is also said to have been excited by thursting a finger or a stalk of lily down the throat.

माडी ब्रवान् माळ्यमांनुत्रास्युंत्सिक्तः भनैः। करिरवालांमुलिभिरेषय्या वैषयिद्विपक्॥ नेववका गुदाभ्यासनाब्योऽवक्ताः भन्नीयिताः। अञ्चपोदकजेः स्रचा : करीरैरिषयेऽन्ताः॥

Su'rata Samhitä, IV. i.

श्वमग्रीयिततान्द्रतान् सरकानवपीड्येत् ।
 तक्षस्य मनुष्यस्य श्रीतैरालेपयेवहिः ॥
 सिक्षान्त्रमिस्ततः श्रितेः सन्या त्रवेकपाचरेत् ।
 उत्पलस्य च नालन कीरपान विधीयते ॥

Susruta Samhita, IV. iii.

अजीर्ण कोणपानीयं सिन्धु पीता वसेत् सुधी: । वसनं पाः यित्वा च जानुसावासने स्थितम् ॥ जन्तर्था (स्थानात्तेन स्थानं वानयेक्षिषक् । स्थाटं वसतः पुंसः पावाँ हो च प्रवीधयेत्॥

Śárngadhara Samgraha, III. iii,

CHAPTER VIII.

HYGIENIC APPLIANCES AND HOSPITAL REQUISITIES.

TOOTH-BRUSH.

They should have the length of twelve anguli and the circumference equal to that of the little finger. Susruta directs us to use a straight and plain branch of such trees as have an astringent, or sweet, or bitter, or sour taste. Amongst these classes of trees, the twigs of Khadira (Acacia Catechu), Madhuka (Brassia Latifolia), Nimva (Melia Azadirachta), Karñja (Pongamia Glabra) are the best. The end of the stick is to be chewed first to form a brush and the teeth are then to be rubbed with it. He recommends us to use some tooth-powder.

तचादी दनपवन गदशाङ्गल मायतं। कनिष्ठिका परिणाइ मञ्चर्यायतमम्बर्ण॥ अयुम्मगन्य यचापि प्रत्ययं श्रमस्मिनं। अवेत्यमृथ दीवच रसं वीर्यञ्च योजयेत्॥ कवायं सपुरं तिकं कटुकं प्रातकत्यतं। निम्बय तिक्कं श्रेष्ठ: कवाये खदिरसया। मधुको मधुरं श्रेष्ठ: करुञ्च: कटके तथा॥

Suśrnta Samhitā, IV. xxiv

चौद्र व्योष विवर्गातं सतेलं सेन्धवेन च। चूर्णेन तेजीवत्याय दलावित्यं विशोधयेत्॥ एकेकं ध्ययेद्दलं सद्ना कृष्ठकेन च। दलशोधन चूर्णेन दलासंसन्यवाधयन्॥ Bhāvamiśra mentions the names of other trees which may be used for the purpose, and also gives us a list of trees to be avoided. The use of the tooth-brush is contra-indicated in the various diseases of the mouth, cars, &c. Caraka advises us to use the tooth-brush twice a day.

कर्क बीखं वट दीतिः करके विजयी भवित् ॥ प्रश्चे चैवावंसम्पात्त्वंद्धं सपुरोधितः । खदिरे सुखसीमधाः विश्वेत विपुलं धनम् ॥ छट्चरे तु वाक्सिहिरावेदारोग्यमेव च । कदन्वे तु धृतिमधा चन्पके च ढदामितः ॥ विरीधे कौत्तिमीमान्य मादुरारोग्यमेव च । चपामार्गे धृतिमधा प्रजायकिमाधाजिः ॥ दाङ्ग्यां सुन्दराकारः कक्कमे कुटजे तथा । जातीतगरमन्दारेदुं:स्वप्रच विन्यस्ति॥

Bhāva Prakāša, I. i.

मृवाकसालिहनाली केतकच बहत्त्व । खर्जुरं नारिकरच समृति त्याराजकाः ॥ त्याराज समृत्यत्तं यः कृष्याद दनाधावनम् । नरयान्त्राल योगिः स्वादयानहङ्गात प्रस्तति ॥

Ibid.

मखादिदमलतालीच जिज्ञारीम समुद्रवि॥
 प्रधास्त्रपाक वासेच कामजिक्का बमीप च।
 दुळेली जीव भक्तय मृच्छीमीमदपीजित:॥
 प्रिरोम्माचेन्यित: याना: पानकमान्तित:।
 पहिती कर्णयालीच दमारोगीच मानव:॥

Suśruta Sambitā, IV. xxiv

आपोशितायं दी काली कपायं कट्ठिककम्।
 भवयद्दन्तपवनं दलमांसान्यवाधयन्॥
 निद्धन्त गस्वेरसं जिद्वादनास्यतं मलम्।
 निक्षय क्विमाधत्ते स्यो दलविकोधनम्॥

Caraka Samhita, I. v.

Susruta mentions the use of a tooth-brush to extract a fish-bone from the throat, 1

After clearsing the mouth with water after meals, I'Tsing ordains? "Chew tooth-wood in the mouth; let the tongue as well as the teeth be carefully cleaned and purified." Again he says: "It is surely not seemly for any one to spend his time after meals chaffing and chattering, nor is it right to remain impure and guilty all day and night, without preparing water in a clean jar or without chewing a tooth-wood."

He continues: "Every morning one must chew tooth-woods, and clean the teeth with them, and rub off the dirt of the tongue as carefully as possible. Only after the hands have been washed and the mouth cleansed is a man fit to make a salutation; if not, both the saluter and the saluted are at fault. Tooth-wood is Danta-kāṣṭha in Sanskrit—danta, tooth, and kāṣṭha, a piece of wood. It is made about twelve finger-breadths in length, and even the shortest is not less than eight finger-breadths long. Its size is like the little finger. Chew softly one of its ends, and clean the teeth with it. If one unavoidably come near a superior, while chewing the woods, one should cover the mouth with the left hand.

Then breaking the wood, and bending it, rub the tongue. In addition to the tooth-wood, some tooth-picks made of iron or copper may be used or a small stick of bamboo or wood, flat as the surface of the little finger and sharpened on one

Suśrata Samhită, I. xxvii.

[े] सदुना वा दलधावनकुर्वकेनापहरेत्।

^{*} PTsing. Records of the Buddhist Religion.—Takakusu. P. 26-7.

³ Ibid. ch. viii. Use of Tooth-woods, P. 33.

end, may be used for cleaning the teeth and tongue; one must be careful not to hurt the mouth. When used, the wood must be washed and thrown away.

Whenever a tooth-wood is destroyed, or water, or saliva is spit out, it should be done after having made three fillips with the fingers or after having coughed more than twice; if not, one is faulty in throwing it away. A stick taken out of a large piece of wood, or from a small stem of a tree or a branch of an elm, or a creeper, if in the forest; if in a field, of the paper mulberry, a peach, a sophora japonica (Huai), willow tree, or anything at disposal, must be prepared sufficiently beforehand. The freshly cut sticks (lit. wet ones) must be offered to others, while the dry ones are retained for one's own use.

The younger priest can chew as he likes, but the elders must have the stick hammered at one end and made soft; the best is one which is bitter, astringent or pungent in taste, or one which becomes like cotton when chewed. The rough root of the Northern Burr-weed (Hu Tai) is the most excellent; this is otherwise called Tsang-urh or Tsae-urh, and strikes the root about two inches in the ground. It hardens the teeth, scents the mouth, helps to digest food, or relieves heart-burning. If this kind of tooth-cleaner be used, the smell of the mouth will go off after a fortnight. A disease in the canine teeth or toothache will be cured after a month. Be careful to chew fully and polish the teeth cleanly, and to let all the mouth-water come out; and then to rinse abundantly with water. That is the way. Take in the water from the nose once. This is the means of securing a long life adopted by Bodhisattva Nagarguna. If this be too hard to put in practice, to drink water is also good. When a man gets used to these practices he is less attacked by sickness. The dirt at the roots of the teeth hardened by time must all be cleaned away. Washed with warm water, the teeth will be freed from the dirt for the whole of life. Tooth-ache is very rare in India owing to their chewing the tooth-wood."

Тооти-Ріск.

Susruta advises us to use sticks of grass as tooth-pick after meals to extract particles of food lodged between the teeth, otherwise these will decompose and the mouth would be smelling badly. Bhāvamiśra gives similar directions but adds that if any particles of food cannot be easily extracted by the tooth-pick, one must not use any force to extract them. "After eating they cleanse their teeth with a wilow stick, and wash their hands and mouth."

JIHVA NIRLEKHANA OR TONGUE SCRAPER.

Suŝruta says: "To scrape the tongue, a golden, or silver, or

Suścuta Sambită, I. xlvi.

एवं भूका समाचासदूचयहण पूलंकम्। भोजने दललग्रानि निर्धयाचमनं चरित् ॥ दलालरमतं चात्रं भोधनेनाहरित् शनै:। कुखादनिर्धतं तकि सुखसानिष्टं गन्धताम्॥ दललग्रमनिर्धायं लिपं मन्धेत दलवत्। म तत वहुष: कुखाद यथं निर्दरणं प्रति॥

Bhava Prakasa, I. i.

दमानरगतं चात्रं शोधनेगाहरै चनैः ।
 कुथादनाहतं तति मुखस्वानिष्टगस्ता ॥

² Beal's Records of the Buddhist Religion, Trans. from Binen Tsiang, vol. I, p. 77.

wooden scraper is to be used. It should be ten anguli long and must be pliant and polished". Caraka² mentions tongue-scraper of copper, lead or brass. Bhāvamisra⁵ also gives a similar discription. It is to be used for scraping the deposit on the tongue. It is still commonly used in India.

RAZOR AND SHEARS. THE PRACTICE OF SHAVING.

Every one is recommended by Suśruta to have his beard shaved, hair trimmed and nails pared.⁴ Caraka⁵ also advises

> े जिश्वानिलेखनं रीष्यं सीवणं वार्डमेव च । तवालापहरं शसं सद्युक्तं दशाहुलं ॥

> > Suśruta Samhitā, IV. xxiv.

मुवर्णस्यतासासि वपुरीतिसयानि च। जिल्लानिर्लेखनानि खुरतीत्मास्तरजुनि च॥ जिल्लाम्लगतं यद्य मलसुक्षासरीधि च। सीगस्या भजते तन तथाज्ञिहां विनिर्लिखन्॥

Caraka Sanhitā, I. v.

जिहानिलेखनं है भे राजतं तासजं तया॥ पाटितं सट् तत् काष्ठं सटुपतमयं तया। "तत्काष्ठं" दनाशोधनशोग्यं काष्ठम्। दशाहुकं सटु खिन्धं तेन जिहां लिखेत् सुखम्। तज्जिहा मलवेरस्य दुगैन्य जङ्ता हरम्॥

Bhāva Prakāša, I. i.

पापोपश्यमनं केशनखरीमापमार्श्वनं ॥
 इर्षलाघव-सीमाग्य-करमृत्साइ वर्डनं ।
 वागवारं सञावर्गं तेजीवल विवर्धनं ॥

Suśruta Samhitä, IV. xxiv.

तवादित एव नीचनखरीचा * *

Ibid.

पौष्टिकं इष्यमायुष्यं युचिरपविराजनम् ।
 केशस्मयुनसादीनां कत्यनं संप्रसाधनम् ॥

Çaraka Samhitā, I. v.

us to shave regularly, that is thrice in a fortnight. Bhāvamiśra says that this practice conduces to health, beauty, longevity and purity, and should be observed every fifth day Razor is mentioned in the Rgveda and in the Kathopaniṣad of the White Yayu. In the Satapatha Brāhmaṇa, we find the method of shaving well described. Then (in shaving) are used a porcupine quill spotted in three places and a copper razor; that three-spotted porcupine's quill resembles the three-fold science and the copper razor resembles the Brāhmaṇa; for Brahmā is fire, and fire is of reddish (lohita) colour, hence a copper (loha), razor is used".

Again we read⁶:—"For impure, indeed, is that part of man where water does not reach him. Now at the hair and beard, and at the nails the water does not reach him; hence when he shaves his hair and beard, and cuts his nails, he does so in order that he may be consecrated after becoming pure.

विः पचस्य केण्यस्युलीमनखान् संहारयेत्।

Carakas Samhitä, I. viii.

पश्चरावात्तस्य प्रमुक्तियरोमाणि कर्त्वेत्। क्रियम् नस्यादीनां कर्तनं सम्प्रसाधनम्। पीटिकं धन्यमायुष्यं शीचकानिकरं परम्॥ "सम्प्रसाधनम्" शीभाजनकम्॥

Bhūva Prakāśa, I. i.

- मं न: ब्रिगीडि भुरिजीरिव चुरंराखराथी विभीचन। Regveda, 8 M. 4 S, 5 A. 7 A. 16 V.
- चूरस्य धारा निश्चिता दुरत्यय दुर्गम्यथमान् कवयी वदन्ति ।
 Kathopanişad, I. iii.

Šatapatha Brāhmaņa, II. 6, 4, 5.

[.] Ibid. 111, 1.2.2.

- 3. Now some shave themselves all over, in order that they may be consecrated after becoming pure all over; but let him not do this. For even by shaving the hair of his head and his beard, and by cutting his nails he becomes pure; let him therefore shave only the hair of his head and his beard, and cut his nails.
- 4. In the first place he outs his nails, first of the right hand, for in human (practice) those of the left hand (are cut) first, but with the gods in this manner. First he cuts those of the thumb—for in human practice those of the little fingers are cut first, but with the gods in this manner.
- He first passes (the comb) through his right whisker for in human (practice they comb) first the left whisker, but with the gods in this manner.
- 6. His right whisker he moistens first with the text "may this divine water be propitious unto me".......

There upon be lays a stalk of sacrificial grass on (the hair of the whisker) with the text "O plant, protect me".......Thereto he applies the razor, with the text "O knife, injure him not".

8. Having cut off (part of the stalk and hair), he throws it into the vessel of water. Silently he moistens the left whisker; silently he lays the stalk of grass on it; and having silently applied the razor thereto and cut through (it and the hair) he throws them into the vessel of water.

He then hands the razor to the barber, and the latter shaves off the hair and beard. When he has shaved the hair and beard......

10. He bathes

- 12. He steps out (from the water) towards the north-east, with the text "cleansed and pure I go forth from them;".......
 - 13. He then puts on (a linen) garment etc."

"The Atharva-veda relates how, when the ceremony of shaving off his beard was performed on king Soma, Váyu brought the hot water and Savitṛī skillfully wielded the razor."

In para. 3, quoted above, we have evidence of the practice of depilation of the pubes which is here forbidden. There are six imortant rules and six minor rules of ordination for the female members or Śramaneris of the Buddhist order. One of the six minor rules is: A female must not shave the hair in any place but the head.² "Aristphanes, a contemporary of Hippocrates,³ Persius and Juvenal⁵ refers to the depilation of the pubes as being common among certain classes, and the early Christian Fathers deplore the practice. See also the remarks of Seutonius on the conduct of Domitan" Prosper Alpinus (16th century) "found the custom still prevalent among the Egyptian women". "The custom survived in France, and Italy in the 16th century".

KEŚA PRASĀDHANĪ OR COMB.

Suśruta directs us to comb the hair to free the head from dust,

Macdonnel's Sanskrit Literature, p. 164.

See l'Tsing, P. 97, Foot-note 3. Vinaya Sangraha. Chap. xii.

^{*} Hippocrates, Ran. 516, Lys 89, 151.

^{*} Persius, iv. 37.

Juvenal, vii. 114.

^{*} Sentonius, xxii.

Medicina Aegypticrum, 111. xv.

Milne, Surgical Instruments &c., p. 90-91,

louse and dandruff. Bhāvamiśra advises us to comb the hair every day to keep it clean, as it stimulates the growth of hair. Caraka also recommends us to keep the hairs clean. The practice of combing the hair is very ancient; the Atharva-veda mentions a comb with a hundred teeth.

LOOKING-GLASS.

The looking-glass should be constantly used as thereby the complexion is said to be improved and life prolonged⁴. For an account of the looking-glass of the ancient Hindus, see Mitra's Indo-Aryans⁵.

DRESS.

Silk, chintz and red clothes are good for the winter, for they are said to be useful for derangement of air and phlegm. Thin silk is cooling and is efficacious for biliary disorders; so it should be used during the summer. It should be coloured twany or red. White clothes are auspicious and are neither hot

Sufruttā Samhitā, IV. xxiv.

केशपाशि प्रकृत्वीत प्रसाधना प्रसाधनम् ।
 केश प्रसाधनं केश्वं रजीजना मलापहम् ॥

Bhāva Prakāśa, 1, i,

³ साध्वेज: प्रसाधितकेणी ⁸ ⁹

Caraka Samhitā, I. viii.

चादशांतीकनं प्रीक्तं माहल्यं कालिकारकम्।
 वीष्टिकं कल्यमायथं पापलची विनाशनम्॥

Bhāva Prakūśa, I, i.

किश्रमाधनी केस्या रजीजन्तु मलापहा।

^{*} The Indo-Aryans Vol. 1, p. 240.

nor cold; therefore they should be worn during the rains1. Caraka says that pure dress conduces to longevity, happiness and fortune2.

USNISA OR HEAD DRESS.

Susruta⁵ advises us to use a cap on our head which is thus protected from injury. Bhāvamiśra says that the habitual use of some form of covering for the head stimulates the growth of hair, increases beauty of the head and protects it from dust, draughts and accumulation of phlegm. Only light caps should be used as the heavy varieties derange bile and cause diseases of the eyes.⁴ For the diagrams of the various forms of turbans used by the ancient Hindus, see Mitra's Indo-Aryans.⁵

- े कोशियीचिक वस्त्रच रक्तवस्त्रनवैव च।

 वातश्चेभ इरन्तनु श्रीतकाली विधारयित्॥

 ''कोशियं'' पशान्तरं चसरवस्त्रच।

 स्थ्यं सुशीतिन्यचार्यं कथायं वस्त्रसुचाते।

 तदारयेट्रच्यकाली तवापि लघु शस्तते॥

 कथायक्षीकटी इति लोके, कथाय रागरकं वा।

 शक्तनु श्वभदं वस्त्रं शीतातम निवारचम्।

 नचीच्यववा शोतन्तनु वर्षांस धारयेत्॥

 Bhāva Prakāša, I. i.
- काम्यं यशस्यमायुष्यमलक्षीप्तं प्रवृष्यम् ।
 श्रीमत पारिषदं शसं निर्मेखान्यरधारयम् ॥

Caraka Samhitā, I. v. Bhāva Prakāša, I. i.

- भवित्र केशसुचीर्थ वातालपरजीऽपर्छ । Sufrate Samhita, IV. zxiv.
- उच्चीयं क्रान्तिक्रत्केस्यं रजीवात कफापडम्।
 लघुतच्चक्रते यस्त्राद गुरु पिताविरोगकत्॥

Bhāva Prakūfa, L. i.

^{*} The Inde-Aryans, Vol. 1, p. 220.

CHATRA OR UMBRELLAS.

Suśruta says: Umbrellas are useful for protecting men from the rains, draughts, glare of the sun, exposure to celd, and dust. They are auspicious and are beneficial to the eyes¹. Caraka² advises us to use it as it protects us from the sun, rain &c. Bhāvamiśra³ also describes its efficacy similarly. Umbrella is one of the insignia of royalty in India, and is always held over the heads of kings as shown in the Sanchi and Amarāvatī sculptures⁴. It is still commonly used in India.

YASTI OR STICKS.

Caraka⁵ directs us to use a stick as a support. Susruta says: "By using sticks, a man gains in strength, prowess and manliness. He becomes courageous, patient and forbearing. He can stand erect and is not troubled by any fear". It

> वर्षानिलरजीयकं हिमादीनां निवारणं। वक्य चत्राम्य सीजसं महरं कत्रधारणं॥

> > Sufruta Samhita, IV. xxiv.

इतिविध्यमं बच्चं गुप्तावरणणकरम्।
 धर्मानिकरजीऽम्बुधं खबधारणम्चति॥

Caraka Samhita, I. v.

कतक धारणं वर्षातपत्रात रजीऽपहम ।
 किमश्रं कितमच्याय माद्रक्यमपि जीर्तितम॥

Bhāya Prakūša, I. i.

- * See Indo-Aryans, 1, p. 266.
- च्छलतः संप्रतिष्ठानं शतुकाच निस्दनं।
 क्षतृष्ठभनमायुषं भयप्तं दक्षधारकम्॥

Caraka Samhita, I. v.

इन: स्रीस्प्याल विवाणिभोभयापइं।
 यमख्यलन दीयवं स्वविरेच प्रश्चते ॥
 स्वीत्साइनलसीयं वैर्थवीयं विवर्धनम्।
 प्रश्चितवाणि भयाः द्वाधारचं॥

Sukruta Samhitä, IV. zziv.

protects a man from dogs, snakes &c. Bhāvamiśra¹ apparently quotes these verses from Suśruta.

UPANAHA OR SHOES.

The ancient Hindus used two kinds of shoes, made of wood and leather. The wooden pādukā is recommended to be used before and after dinner. The good effects claimed by its use are, an increase of the power of vision, strength and longevity. When travelling, the upānaha or leather shoes are to be used. Besides the advantages mentioned above, shoes are very comfortable to the travellers and prevent many diseases of the feet. If any one often travels barefooted, he feels out of sort, his senses fail, vision becomes impaired and his expectation of life is reduced.

- Bhava Prakasa, I. i.
- पादकारोहचाडुर्खात् पृथ्वं भीजनतः परम् ।
 पादरोत् हर इष्यं चच्चाचानुषी हितम् ॥

Bhava Prakasa, I. i.

चतुष्यं स्पर्णनिष्ठतं पादवीर्व्यस्तापन्नम् ।
 चल्यं पराक्रमसुखं वृष्यं पादचधारशम् ॥

Caraka Samhitā, I. v.

पादरोगस्रं वर्षं रसीम्नं प्रीतिवर्धनं।
 सुखप्रचारमीजसं सदापादतधारणं।
 यनारोग्य मनायुष्यं चस्त्रपीकपचातकत्।
 पादाभ्यामनुपानद्वां सदा चंक्रमणं नृषां॥

Suéruta Samhitā, IV. xxiv.

उपानदारणं नेतामायुष्यं पादरोगद्यत् ।
 सुखप्रचारमोजस्यं त्रष्यच परिकीर्तितम् ॥
 पादास्थामनुपानद्यां सदा चंत्रमणं नृणाम् ।
 पनारोग्य मनादृष्यमिन्द्रियम् नदष्टिदम् ॥

Bhava Prakais, I. i.

The Hindus were sandals like the ancient Greeks. They also used boots, which look like the modern boots used by Europeans. Buddha gave the Bhikkhus permission to wear boots or shoes, with thick lining. Hinen Tsiang says that "here (Avanti) Tathagatha gave permission to the Bhikkhus to wear kih-fu-to (boots)." For an account and figures of ancient boots used by the Hindus, see Indo-Aryans.

VYĀJANĪ AND CĀMABA. THE FAN.

The fan was used for airing the patients to drive away flies. Susruta mentions the camara i.e., the tail of the Thibetan yolk (Bos grunnius) to be used as a fan. "It soothes the inflammation of boils and also acts as a fly-brush to prevent infection of the open wound". The camara is also one of the insignia of royalty and as such we have many representations of it in the sculptures of ancient India. For diagrams of the ancient fan, see Indo-Aryans?.

Caraka directs us to use a kulā or fan to winnow corn, prepared from the kāśa (Saccharum Spontamum) to resuscitate a still-born child*.

Sairuta Samhita, IV. xxiv.

Ibid, I. xix.

Mohāvagga, varga 13 ff 6. S. B. E. vol. xvii. p. 35.

Beal's Records, of Buddhist Religion, vol. II. p. 280.

Indo-Aryans, Vol. 1, p. 123-6.

वालव्यत्रन मीत्रस्यं मचिकादीनपोइति ।
 शोषदाइ यमस्वेद मुख्याची व्यतनानितः ॥

^{*} अजीत वालवाजनैर्द्धमां नच विघटयेत्।

^{*} See Indo-Aryans, vol. 11, p. 267-70.

For diagrams, see Indo-Aryans, vol. 1, p. 263.

[ै] तया रंक्रेमविहतान प्राणान् पुनर्लभेत क्रणकपालिकायप्य चैनमभि:निधुनीयाद-सभेष्टं स्थात् यावत् प्राणानां प्रयागमनं तत्तत्सर्वमेवकुर्यः॥

Bhāvamisra¹ mentions fans made of the following materials:—
palm leaf, bamboo, yolk's tail, cloth, peacock's feather and cane.

He attributes peculiar properties to each fan.

Rājavallabha says² that "the palm-leaf fan overcomes disturbances of all the three humours, and is light and agreeable; the bamboo fan causes heat and irritablity, and promotes inordinate secretion of the two humours—air and bile; the cane, cloth and peacock's feather fans, overcome disturbances of the three humours; the hair fan is invigorating etc."

The Buddhist Bhikşus used the palm-leaf fan. "Not unfrequently there is added a lotus-leaf shaped fan, made from a single frond, with an edging of bamboo or light wood, and furnished with a handle fashioned like the letter "S". The palm from which the leaf is taken, is also that used for the mss., namely the Talipot; hence the name Talponi given to the Bhikkhus by the early Portuguese adventurers in Burma. When he attended a meeting at which women are likely to be present, every Bhikkhu must have the fan." **

यजनसानिनो दाह स्वेदम्चा यमापहः। तालक्तमनी वातिनिदीषयमको मतः॥ वंशव्यजनजन्नुको रक्तपित्तमकोपणः। चामरो वस्तमकृतो माजूरो वेवजनाया॥ एते दोषजिता वाताः सिन्धा छदाः सपुजिताः।

Bhāva Prakāśa, I. i.

ग तालव्यजनगुकः—बिदीयशमनलम्। लप्तत्व ॥ वंशव्यजनगुकः—क्वलम्। छक्षलम्। वागुपित्तकारित्वच ॥ वेतवस्त्रमयूरपुक्षव्यजनगुकः—िवदीयनाशिलम्। वालव्यजनगुकः—तेजकारेलम्। मिक्कादि निवारकत्वच ।

Rājavallabha.

The Way of Buddha, p. 53-54.

FILTERS.

Filters were used by the Hindus and are recommended to be made of an earthen or metallic vessel, the mouth being closed by a piece of cloth tied round its neck.

If the water be filthy, Sušruta¹ advises us to purify it by boiling it or by exposure to the sun; or by throwing hot iron balls, sand or clay balls into the water and then allowing it to cool. Such purified water should be scented with the flowers of Nāgakešara (Mesua Ferrea), Campaka (Michelia Champaca), Utpala (Nymphæa Stellata) and Patala (Bignonia Snavcolens).

Susruta mentions seven means of purifying polluted water2,

- 1. Kataka phala or nirmālaya or seeds of Strychnos Potatorum.
- 2. Gomedaka or a kind of gems.
- 3. Vişagranthi, or root of Nelumbium Speciosum.
- 4. Śaivālamūla or root of Vallisneria Spiralis.
- 5. A piece of cloth.
- 6. Pearls.
- 7. Precious Stones and crystals.

Suśruta Samhitā, I. xlv.

तव सप्तकलुपस्य प्रसाधनानि भवनि । तदावा । कतकगीभेट्कविषयियियेवालस्ल-वस्त्राणि मुकामणियेति । पचनिचेपणानिभवनि । तदावा । फलकं ताष्टकं मुखबलय उदकमखिकाणिकाचेति । सप्तशौतिकरणानि भवनि । प्रवातस्वापनमुदकप्रचेपणं यष्टिका-सामणं व्यजनं वस्त्रोद्धरणं वालुका प्रचेपणं शिकावलस्वनचेति ।

व्यापद्मानामधिकचनं न्यातपप्रतापनं तत्रावःपिण्डसिकतालीडावां वा निर्व्वापनं
 प्रसादनच कर्तत्रं नागवन्यकोत्पलपाटलापुणप्रस्तिभियाधिवासनमिति।

He mentions five kinds of means for preventing contact of the water vessel with the earth :-

- 1. Phalaka or planks as of Salmali wood.
- 2. Tryastaka or octogonal tripod of wood.
- 3. Munivalava or circular pad of Saccharine Munja.
- Udakamañcikā or a raised framework of cane and bamboo.
- 5. Śikya or a loop suspended by three strings.
 He mentions seven ways of cooling water:—
- 1. Exposure to air.
- 2. Sprinkling water on the vessel.
- 3. Stirring the water with a rod.
- 4. Fanning the water.
- 5. Filtration through cotton fabrics.
- 6. Putting the vessel of water on a sand bed.
- 7. Suspension of the vessel in a loop.

He advises us to use rain water filtered through a broad piece of white and clean cloth². In collecting water from the rivers and ponds, the Hindu females still use a kalasī or earthen vessel, the mouth being closed by a piece of cloth.

In the English translations of the Susruta Samhitā, Bibliotheca Indica, Dr. Cattepādhāya translates the passage incorrectly. He misunderstood the terms phalaka, &c. to be remedial agents, necessary in the provincation of water.

गाइं पुनः प्रधानं तट्पाददीतावयुत्रे नासि यचित्रक्रवित तपटेकदेशच्युतसय वा इन्यातलपरिसप्टमनीक्षा यचिमिर्माजनैर्यः हीतं ।

Suśruta¹ deprecates impure water as injurious to the human system and advises us not to drink or bathe in such water as there is always the risk of being speedly affected with many diseases.

"It (filter) forms one of the eight sacred utensils necessary for a sramana of the Buddhist order. It is a strainer or water-dipperan appratus for filtering the water which he drinks, so that he may not, even unwillingly, take animal life"²

One of the six requisites of a Bhikṣu is Parismavana, a water-strainer³.

WATER VESSEL.

To store water, Susruta mentions vessels of gold, or silver, or earth⁴.

"The clean water is kept separately from water for cleansing purposes (lit. 'touched' water), and there are two kinds of jars (i.e. kundi and kalasa) for each. Earthenware or porcelain is used for the clean jar, and the jar, for water for cleansing purposes (lit. touched water) is made of copper or iron. The clean water is ready for drinking at any time, and the 'touched' water for cleansing purposes after having been to the urinal.

बापनं वर्जयित्रित्वं तीयं यद्याप्यनार्गवं। दीषसञ्जनं स्वेतन्नाददीताहितन्तु तत्॥ व्यापनं सिल्लं यस्तु पिवतीहा प्रसाधितं। स्वयुं पाखुरोगच लग्दीपनविपानतां॥ सासकासप्रतिग्रायग्रलगुल्नीदरानि च। स्वान् वा विश्रमान् रोगान् प्राष्ट्रयात् चिप्रमेवन॥

Sufruta Samhita, I. xlv.

¹ The way of Buddha, p. 53.

l'Tsing, ch. x.

सीवर्ष राजते सन्त्रये वा पावे निदध्यात् तस्त्राञ्चकालसुपयुत्तीन तस्यालामे भीमम्।
 Ibid.

The clean jar must be carried in a clean hand, and be placed in a clean place, while the jar for the 'touched' water should be grasped by the 'touched' (or 'unclean') hand and be put in an unclean (or 'touched') place. The water in a pure and fresh jar can be drunk at anytime; the water in any other jar is called 'special water' (more lit. seasonable water i.e. water to be used at certain prescribed times, probably kâlodaka)."

BATHING.

The Hindus in their daily life do not eat without having first washed themselves in a bath. They always use a bathing-sheet and this ancient practice is still followed.

Bhāvamiśra says²: "Bathing stimulates the appetite, virile power and strength, prolongs life, allays thirst and burning sensation, cures eczema, and washes out dirt and perspiration."

Besides the ordinary bath, there is some evidence of the use of a medical bath to cure diseases. I'Tsing says³: "The World-honoured One taught how to build a bath room, to construct a brick pond in an open place, and to make a medical bath in order to cure a disease. Sometimes he ordained the

Tring, ch. vi.

हीपनं इष्यमायुष्यं सान मीजी वलपदं। क्ष्युमलयमःस्वेदतन्द्रा ढड्दाइ पापनृत्॥ बाह्यस्य सेके: शीतायौ क्षान्तवांति पीकितः। नरस्य सातमायस्य दीष्यते तेन पावकः॥ शीतेन पयसा सातं रक्षपित्तपशान्तिकत्। तदेवोष्येन तीयेन वल्यं वातकपापहम्॥ शिर: सानमवद्यस्य मञ्जूषेनास्तुना सदा। वातश्चे स्र प्रकोपेत् हितनस्य प्रकीशितम्॥

Bhava Prakasa, I. i.

whole body to be anonited with oil, sometimes the feet to be rubbed with oil every night, or the head every morning; for such a practice is very good for maintaining clear eyesight and keeping off the cold." "Bathing should always take place when one is hungry. Two kinds of benefits are derived by having meals after bathing. First, the body is pure and empty, being free from all dirt, second, the food will be well digested, as the bathing makes one free from phlegm or any disease of the internal organs. Bathing after a good meal is forbidden in the 'Science of Medicine'" (Kikitsā-Vidyā).

DRINKING VESSEL.

Scented water is advised to be drunk out of cups made of gold, or silver, or copper, or bell-metal, or lapis lazuli or earth.

Bhāvamiśra also mentions cups of the same materials.

"To drink from a jar holding it upright in front is no fault; but drinking in the afternoon is not permissible. A jar must be made to fit one's mouth; the top of the cover should be two fingers high; in it a hole as small as a copper chopstick is made.

Fresh water for drinking must be kept in such a jar. At the side of the jar there is another round hole as large as a small coin, two fingers higher than the drinking-mouth. This hole is used for pouring in water; two or three gallons may be put in it. A small jar is never used.

See foot-note 2, P. 65.

जलपावना तासस्य तदभावे सदोहितम्। पवितं शौतलं पाचं गठितं स्प्रिटिकेन यत्॥ काचेन रचितन्तद्वत्तवा वैट्यं सन्धवमः।

If one fear that insects or dust may enter in, both the mouth and the hole may be covered by means of bamboo, wood, linen, or leaves. There are some Indian priests who make jars according to this style. In taking water the inside of the jar must be first washed in order to get off any dirt or dust, and then fresh water must be poured in.

A priest who travels, carries his jars, bowl, necessary clothes, by hanging them from shoulders over his cloak, taking an umbrella in his hand. This is the manner of the Buddhist priests in travelling¹."

DINNER SERVICE.

Suŝruta² advises us to use different kinds of vessels for distributing the various kinds of food:—

Iron vessels for ghee or clarified butter.

Silver vessels for drinks, soups and gruels.

¹ PTsing, ch. vi.

श्रुतं कार्णायसं देवं पेया देवात राजते। फलानि सञ्चेभत्यांच प्रदेशारेदलेषु च। परिश्रकप्रदिन्धानि सीवर्णेषु प्रकल्पवेत्॥ प्रद्रवाणि स्वडा वैव सन्तान् शेलेषु दापयेत्॥ द्यानासमये पाचे सुशौतं सुशतं पयः। पानीयं पानकं मयं सन्त्रवेषु प्रदापयेत्॥ काचक्किटिकपावेषु शीतलेषु समेषु च। द्याःद्रियंपावेषु रागषाडवसहकान्॥ पुरसादिमते पावे सुविकीर्णं सनीरमे। सृदः सुपीदनं द्यात् प्रदेशंच सुसंस्कृतान्॥

Plantain leaf vessels for fruits and sweetmeats.

Gold vessels for flesh.

Stone vessels for whev.

Copper vessels for milk.

Earthen vessels for water, sherbets and wines.

Glass, erystal, lapis lazuli vessels for rājṣāḍava and saṭṭaka.

In the Bhāva Prakāša¹ we have a detailed description on the subject—"A dinner service of gold is the best from a medicinal point of view, and it is supposed to be the best tonic for the eye. Eating out of silver is equally efficacious for promoting hepatic functions. A service of zinc improves the intelligence and appetite. Food served in brass utensils promotes wind and heat, but cures phlegmatic disorders and expells worms. The use of steel or glass vessel cures chlorosis, jaundice and intumescence. A stone or clay service brings on poverty. Wooden plates are good appetisers, but help the secretions of phlegmatic humour. The use of certain leaves as plates acts as an antidote against poisons. When at dinner, a water jug with a cup should be placed on the right hand. A copper vessel is the best for the purpose. The next best is an earthen pot. Vessels made of crystal and lapis lazuli are also pure and cooling". 2

भावस्य काचपाते च भोजनं सितिकारकम्। जीव पास्तुक्तरं तथ्यं कामलापद्वमुत्तमम्। जीविये सत्सये पाते भोजनं वीनिवारणम्। दानद्वते विजीवेण क्विदंत्ये प्रकारितः। पातं पत्तमयं क्यां दीपनं विषयापन्तः॥

Bhava Prakūśa, Li.

History of Aryan Medical Science, p. 64-5.

SPOONS.

I'Tsing says¹: "As to the mode of eating in the West, they use only the right hand, but if one has had an illness or has some other reason, one is permitted to keep a spoon for use."

SPITTOONS.

Spittoons were commonly used by the ancient Hindus, and Caraka² mentions it as one of the things necessary for the sick room. It is also mentioned in the Mohāvagga³: "And the sethe's wife spat it out into the spittoon." Fa-Hian⁴ noticed a "stone spitting vessel in this country (Kie-sha) belonging to Buddha."

BEDPANS AND URINALS.

The bedpan and urinal were also used by the patients in ancient times. Caraka metions them to be necessary in a sick room.⁵

PUS BASINS.

Metallic basins marked with different measures were used for holding discharges after operations. In the Aśvavaidyaka⁶

^व चोपन्यसभाक्षार प्रतियञ्जाचि ।

प्रतिसहांचीपचारवित ॥

Caraka Samhita, I. xv.

- 3 Sacred Books of the East. VIII: i. ll.
- Beal's Records, vol. I. Introduction, xxviii.
- See Page 36 and foot-note 1, P. 34.
 - प्रदेश लोमशे नित्यं लोमान्युतपादा वेधवेत् ।
 प्रमागार्थंच पातेग रक्तं रङ्गति वृद्धिमान्॥

¹ I'Tsing, ch. xvi.

blood let out in the operation of phlebotomy, is recommended to be collected in a basin, so that the quantity may at once be determined.

PESTLE AND MORTAR.

Pestle and mortar are mentioned in the Rgveda for preparing the Soma juice. And their use in pharmacy was wellknown to the ancients.

Besides the pestle and mortar of pharmacy, we find mention of a large wooden pestle used in reducing dislocation by Suśruta.² Caraka says that two pestles and motars should be kept in a lying-in-room, the object being to allow the woman some kind of work; and then she will not lie down idly on her bed if there be any delay in the delivery of the child. Suśruta also recommends it. "The mortar (ulukhala) and pestle (muṣala) are to be made of very hard wood, viz., both of Varana wood (Crataiga Roxburghii), or the mortar of Palāśa wood (Butea Frondosa), and the pestle of Khadira wood (Acacia Catechu). The former

¹ उन्यतन्त्रतानामविश्वित जन्मुनः ॥

यचिति लं रहे रह उल्खलक युज्यसे।

Rgveda, 1 M. 28 S. 1 A. 2 R.

सा चेटावीभि: संक्षियामाना न प्रजायतायेना ब्रूयात् उत्तिष्ठम्यलमन्यतस्त्र सङ्गीष्वानेनेतदु-दूखलं धानापूर्णे मङ्ग्युंहरिकाहि सुङ्ग्युंहरवज्यास चंक्रमस्य चानारानरा द्वीवसुपदिस्थान्यके । Caraka Samhitā, IV. viii.

 कालातीतस्वाधिन गर्भ विशेषतः सधायसुद्खलंभ्यलेनाभिष्ठत्यादियसे वा यानासने सेवतः।

^{*} See foot-note 6, P. 172.

² See P. 39, and foot-note 1, P. 40.

is to be of the height of the knee and the latter three aratnis (cubits) long¹."

On the inner face of the left pillar in the eastern gate of Sanchi Tope, there is a beautiful representation of a kitchen scene, in which the ancient mortar and pestle are shown. "The mortar and two-handed pestle same as those in use at the present day in India. The mortar (okhli) is exactly the same as the Greek $\ell\gamma\delta\eta$, and the Roman pila; and the pestle (musar) is the same as the Greek $K\delta\pi\alpha\nu\sigma\nu$, and the Roman pilum"²

The pestle and mortar used in pharmacy was called asmabhālam. It is still used to pulverise medicaments, and is made of iron or brass.

In the Mahāvagga³ we find a reference to the pestle and mortar. "I allow, O Bhikkhus, the use of a chunam as a medicine by whomsoever has the itch, or boils, or a discharge or seabs, or whose body is ill smelling, and to those in health the use of dry dung, and of clay, and of coloring matter. I allow, the use, O Bhikkhus, of a pestle and mortar" (udukhalam nusalañ &a).

SIEVES, STRAINERS AND FILTERS.

There is evidence that cloth seive was used by the Hindus in ancient days, we find it mentioned in the Rgveda⁴. The purpose of straining and filtering solid and liquid medicines respectively is mentioned to have been served by two or

Schol, on Katy, 1.3.3.6, footnote, Satapatha Brahmana (Sacred Books of the East, 1.1.4.8.)

^{*} Cunningham's Bhilsa Topes, p. 207.

Mohāvāgga VI. 9. 2.

^{*} Rgveds, 10m. 71s, V 2

three layers of a piece of cloth. And we know that in the prehistoric Soma rites, it "was pressed, passed through a seive, mixed with milk, and offered as the main oblation".

The reference to a cloth sieve, we find in Mohāvagga¹:
"Now at that time the Bhikkhus who were sick had need of sifted chunam as medicine.

They told this thing to the Blessed One.

"I allow, O Bhikkhus, the use of a chunam sieve".

They had need of the chunam very fine.

"I allow, O Bhikkhus, the use of a cloth sieve".

Pavitra was used in the Vedic times². It was a filter. Wilson translates it: "Trough the purifying filters".

COLD AND HOT APPLICATIONS.

To relieve colic pains, vessels made of silver, copper or precious stones, containing cold water, are directed to be placed upon the part or better upon the navel³. Besides these, leather vessels containing cold water are also directed to be used for reducing the temperature in dilirium tremens.⁴

Mohāvagga VI. 10. 1.

मणिराजत तासानि भाजनानि च सर्व्वगः । वारिपूर्णानि तान्यस्य गुलस्थोपरि निविषेत् ॥ Sufrata Samhitä, VI. xlii.

ईमराजत कांस्थानां पाताचां भीतवारिभि: ।
 पूर्वानां हिमपुर्णनां हतानां पवनाहता: ॥

Heat is directed to be applied to the patient's body in various ways 1:—

- Tāpasveda:—palm of the hand, brass dish, sand, cloth, potsherd &c. are the means mentioned for applying heat to the body.
- II. Uşṇasveda:—potsherds, stone, bricks, or iron balls are to be heated to redness and then water is to be sprinkled upon them. The part to be fomented is covered by a wet piece of thick lint and then the heated materials are to be applied over it. Or heat may be applied by means of a narrow vessel containing hot decoctions. The vessel is to be surrounded by a piece of

तव ताप-स्वेद:। पाणि कांस्थकन्दकपाल वालुकावस्ते: प्रयुक्ति श्यानस्वचाङ्गतापी वहुश:
स्वादिराङ्गापैरिति। उणा-स्वेदस्त कपाल पाषाणिष्टकालीक-पिण्डानिधवणांनिष्ठ रासिन्देदस्य
द्रव्येवांते राद्रालक्षक परिविष्टितसङ्ग-प्रदेशं स्वेदयेत्। सांस रस प्रयोदिध धान्यास्ववातस्वर
पत्रभङ्ग काम पूर्णां वा क्ष्मीसनुत्रतां प्राव्योधाणं रहङीयात्। पार्श्व विदेश वा क्षमोनाधीस्वीत तस्य सुख्यस्थिसन्याय तस्यन् विदे हन्ति यण्डाकारां नाडीं प्रशिधाय तस् स्वेदयेत्।

सुखोपविष्टं स्वभः कं गुरू प्रावरणाहतं। इसियंश्विकया नाथा स्वेदयेदात-रोगिणं॥ सुखा सञ्चांक्रया द्वीषा नच क्रियाति सानवं। व्यामावंभावा विवैका इसि इस समाक्रतिः॥ स्वेदनार्थे हिता नाडी केलिशी इसी यनिका।

उपनाह स्वेदम् वातहरम्लक करस्य पिष्टेर्लवण प्रगादेः सुखिन्धेः सुखोणेः प्रदिश्च स्वेदयेत्। एवं काकोल्यादिभिः सुरसादिभिक्तिलातमौ सर्थप कन्कैः क्रणरा पायसीत्कारिका-भिव्वस्वारैः शाल्यांव्यातन्वस्वावनहैः स्वेदयेत्।

द्रव स्वेदस्तु-वातस्र द्रव्यकाय पूर्णे कीण कटाई द्रोग्यां वावगास स्वेदयेत् । एवं पयोमांस-रस-पुष-तेल-धानाम्य-एत-वसा स्वेधवनगाईत सम्बोणैः कषायैः परिविधेदिति ।

चतुर्शिथ: स्वेदसद यथा। तापस्थेद छचास्वेद उपनाइस्तेदोद्रव स्वेद इति। चत्र सर्शेत्वेद विजन्यावरीथ: ॥

eloth to prevent the skin from being burnt. Or heat may be applied by the following device:—an earthen vessel or kalasī containing hot decoctions is to be closed; and the vessel is then to be inverted. Then a hole should be bored on its side, and a tube shaped like an elephant's proboscis is fitted to it; the vapour issuing from the tube is allowed to play on the part.

To apply vapour bath:—put the hot infusion of medicinal substances into an earthen vessel and close its mouth. Drill a hole into the side of the vessel and adapt a tube to it. The tube may be either metallic or wooden. The tube should be two hands (forearm and hand) long and made of three pieces; the end of the tube which should taper like a cow's tail must be six anguli long. The patient should be seated on a stool and well covered with cloth. The tube is then introduced inside the blanket, and thus the issuing vapours heat the whole body. (Śārńgadhara¹).

Susruta says that the tube should be half byām (i.e., the distance between the two hands when extended) long, bent thrice and shaped like an elephant's proboscis. Sometimes a large stone slab is to be heated with burning wood of Acacia Catechu. Then after removing the ashes, the patient is directed to lie upon it. A tent or cloth-cover having four doors is sometimes required for the patient to sit in, and heat is applied by burning wood outside it.

षधवा वातिननंशिद्रत्यकाधरसादिभिः।

उर्केषेटं पुरियत्वा पार्वे किटं विधाय च॥

विसुद्रास्थं विस्वयाच धातृजां काष्ठजां तथा।

पड्रहुलास्यां नीपुर्कां नाड्गे युधात् विद्यस्तिकां॥

सुखोपविष्टं स्वश्वज्ञं गुरुप्रावरणावतम्॥

इस्तीयस्थिकया नावा। स्वद्येदातरीसियम्॥

Sarngadhara Samgraba, III. ii.

III. Upānahasveda or poultices:—roots of medicinal plants are to be pressed and formed into a paste with mustard, sesame etc. This is to be heated, put on a thin cloth and so applied.

IV. Dravasveda or hot bath:—the patient is to sit in a tub or vessel of hot water. Iron pails or tubs are recommended to be used by patients to take bath in some infusions. Sārngadhara says1: The tub (dron1) should be made of gold, or silver, or copper, or iron, or wood. The height and length of the tub should measure thirty-six anguli each. When the patient sits inside, the height of water should stand six anguli above the navel. A dron1 filled with oil is to be used for placing an unconscious patient in it to overcome the shock caused by fall, blows, fractures and other injuries.

Cakradatta² describes the four methods of applying heat, Bhāvamiśra also describes them similarly³. Hārita, however, mentions seven methods of heat-application⁴.

- मोवण राजतं वापि तासमायसच दाकजम्।
 कोष्ठकं तथ कुळाँतोच्छाय पट्चिंगदङ्गलम्॥
 चायासँग तदेवस्याचतुष्कं सस्य तथा।
 मार्सः यङ्कुलं यावन्यग्रः कायस्य धारया॥
 - Saragadhara Saingraha, III. ii.
- तमे: मैकतपाणिकांश्वनमने: स्वदोऽयवाङारक-र्लपादातहरे: महास्थलवणसेहै: सस्वीणमैनित्। एवं तप्तपयोऽन्यूनातमनकाथादिमिकादिभि-सप्तिस्थिनगेडवङ्ग्ह्यापे: मिलाये: क्रमात्॥ Cakradatta, Svedādbikāra.
- स्वेदयतुर्विधः प्रोक्तमापीणस्वेदसंजितः।
 चपनाहो द्रवः स्वेदः सम्बं वातानिसारिणः।
 तापस्वेद चण्रस्वेदय ताम्यां संजितः।
 Bhava Prokāša, I. i.
- स्वेद: सप्तविव: प्रीक्री लोटस्वेदी वाणस्वेदीऽग्रिज्वालास्वेद: ।
 घटस्वेदी जनस्वेदी फनस्वेदी वालुकास्वेदच ।
 Harita Sambita, V. iv.

BALANCE OR MĀNADAŅDA.

For weighing medicinal substances, the scales and balance are often mentioned. They mention a set of weights and measures to be used in weighing substances. Alberuni¹ describes the Hindu balance thus:—"The balance with which the Hindus weigh things, are χαρίσ τίωτξως of which the weights are immovable, whilst the scales move on certain marks and lines. Therefore the balance is called tūla. The first lines mark the unit of the weight from 1 to 5, and further on to 10; the following lines mean the tenths, 10, 20, 30, &c. In Fergusson's Tree and Serpent Worship we have a diagram of steel-yard, where a man is represented as stepping in the scale, apparently to weigh himself². The ordinary balance is still in common use amongst the kavirājes of the present day.

COLLYRIUM POTS.

The Hindus used to apply collyrium to their eyes, from a very early time. It is said to stimulate the growth of eye-lashes, brighten the lusture of the eye-balls and clean the pupil³.

Bhāvamiśra4 recommends us to use collyrium as it improves the visual power and cures many diseases of the eye. It is

Sušrutā Samhitā, IV. xxiv.

मीवीरमधनं नित्यं डितमणांसती भजित्।
 लोवने भवतसीन मनीधे स्व्यदर्शने॥
 ''मीवीर'' खेत सुरमा इति लोके प्रसिद्धम्।
 खोतीद्धनं मतं येष्ठं विग्रदं सिन्धुसम्बद्धन्॥

Alberuni's India. Trans, by Sachau, vol. 1, p. 146.

The Tree and Sepent Worship, the pl. lxxxiii, fig. 1.

पञ्चलं विश्वदं काम्तममलोञ्जूल मरहलं ।। निवसञ्चन संवीगादभविश्वामल तारलं ।

contra-indicated in patients suffering from fever, emesis, exhaustion, &c.

Susruta mentions collyrium pots of different metals intended for different kinds of collyrium then in use—

gold	pots	for	sweet	collyrium.
silver	pots	for	acid	collyrium.
horn	pots	for	salt	collyrium.
copper & iron	pots	for	astringent	collyrium.
lapis lazuli	pots	for	sour or acid	collyrium.
bell-metal	pots	for	bitter	collyrium.

He also mentions pots of ivory, or crystal, or coral, or horn, or conch-shell, or stone, or gold, or silver.

He also mentions a piece of bamboo for storing collyrium²
A bamboo is still used by the poor for keeping oil in India. For
a similar purpose the wood of Khadira (Accacia Catechu) is also

डटे: कक्षूमलहरं दाहक्रेट रजापहम्। प्रकारपारहचेव सहनेमारतातपी॥ नेवेरीमा न जायनी तसादधन माचरित्।

''बीतीऽसनं'' कणसूरमा इति लीके प्रसिद्धं ॥ ''विग्रदं'' शोधनं विनापि । ''सिन्धसम्प्रवम्'' सिन्धनाम पर्व्यतमात्र सम्प्रवम ।

> राती जागरितः यानाः इहिंतो भुक्रवांस्था। ज्यरातुरः शिरखाती नाकीरखनसाचरित ।

> > Bhāva Prokāša, I. i.

¹ See foot-note 3, P. 67.

कुलकामोकमालासपियङ्गलिनीत्पलै: ॥ पृष्पैर्भरेगकषाज्ञापव्यासलक संयुते: । सप्पि संयुत्तेयकीतकानाज्ञासकस्थिते: ॥

recommended. For storing oil, Dr/havala² mentions the use of vessels of stone or the horn of a lamb or iron.

MEDICINE GLASS.

Sukti or shell of mussell was used as medicine glass. The shell of the fresh water mussels unionacea is mentioned to be used for holding a dose of medicine for administering it to a patient3. They generally have equivalve, though not equisided, shells which are covered externally with a smooth brown epidermis and internally by a mother-of-pearl layer. Such a shell "is said to have been formerly much used in Engliand by painters for holding their colour and so the commonest variety is termed unio pictorua. To apply oleaginous errhines, Suśruta⁴ recommends us to use metallic pots or the shell of mussel. It is still used in India for feeding the babies with milk and also for administering medicines to the patient. Heynes (1814) says that "according to the nature of the disender, the medicines should be taken out of gold, silver or brass vessels. But if these should not be at hand you may use iron or even earthen vessel."

> सैस्वीपहितं युद्धाविहितं वेश्ववद्दाः मेदीयकदृष्टतवात्रं पिप्रल्यः सेस्वतं स्थु॥ रसमामलकवापि पकं सम्यङ् निधापयित्। कोत्रे खदिरनिकाले तदत् सुद्राप्तनं हितं॥

> > Suśruta Samhita, VI. xvii.

See foot note, 4, P. 67.

तत उपमंख्तशरीर: प्रात: प्रातकत्याय पाणिगृहिमाच' चौद्रेण प्रतिमंद्यज्योपयुश्चीत ।
 Suéruta Samhitā, IV. x.

वामहस्त प्रदेशिक रोझामितनालायाय विश्व सीतिस दिलिण हसीन से इसुधान तम
 रजत सुवर्ण तासस्त्पाव युक्तिनामन्यतम वं युक्ता पिनुना वा सुखोष्यं से हमदुत्सासिक्षेद व्यविक्दिन्धारं यथानेवेन प्राप्नीत ।

Dr. Heyne's Indian Tracts,

DROPPER.

The Hindus used a tent of cotton as a drop conductor. Cakradatta¹ advises us to drop medicines into the eyes thus:—
the patient should be made to lie down in a place free from draught; the surgeon is to open his eye with the left hand, while with the right, he allows 10 or 12 drops of medicine to fall from a height of two anguli on the eye from a tent of cotton, immersed in medicine contained in a clean vessel.

GRIND-STONE.

Grind-stone to pulverise medicaments is mentioned. In the Mahāvagga[±] we find a reference to it. "I allow, O Bhikkhus, the use of a grind stone, and of another stone to grind upon" (pisana-śilâ ka pisana poto ka—Buddhaghosha).

STONE AND IRON MULLER.

For similar purpose a stone slab and iron muller are necessary to make pastes and powders of medicines. On the inner face of the left piller in the eastern gate of Sanchi Topes, the kitchen scene is represented, in which "a fourth woman is seated grinding spices or condiments on the sil, or flat stone, with a bant or round muller.".

KHAL OR ELLIPTICAL MORTAR OF STONE AND PESTLE.

To prepare medicines to be exhibited to the patients, a small

Cakradatta, Āśotancyāñfana Adhikāra.

^{&#}x27; निवातस्यस्य वामेन पाबिनीकील्य लोचनम्। यजीमलम्बयानेन पिचुवर्च्या कनीनिक। दम दादभ वा विन्द्रन् दाबुलादवसेचयेन्।

Mahavagga vi. 3.2.

Cunninham Cunningham's Bhilsa Topes, p. 206.

elliptical mortar is generally used when the medicines require to be thoroughy mixed with some excipient.

The following appliances, besides those mentioned before, become necesary in pharmacy:—

- 1. Iron pails of various sizes.
- Vessels of iron, copper, silver, brass and earth for storing medicines.
- 3. Spoons of wood or darvi; large metallic spoon or hata.
- 4. Iron sandamsa or pinchers.
- 5. Rods of wood or iron.
- 6. Blacksmith's bellows.
- 7. Ankuśa or hooks like the elephant driver's goad.
- 8. Iron hammer.
- 9. Earthen crucibles of different sizes.

CHAPTER IX.

THE CONCLUSION.

In the recent edition of the System of Medicine, Prof. Albutt1 begins his article on the History of medicine with the following observations: "The medicine of Egypt and the East, extensive and intricate as it was, in so far as it was not Greek did not contain even the rudiments of science. To it Western medicine owes virtually nothing, and in this article at any rate, it may be disregarded". Prof. Osler2 also speaks in the same strain: "Crude and bizzare among the primitive nations, these ideas of disease received among the Greeks and Romans a practical development worthy of these peoples. There have been systemes of so-called divine healing in all the great civilizations, but for beauty of conception and for grandeur of detail in the execution, all are as nothing in comparison with the cult of the son of Appolo, and of Æsculapius, the god of healing." "Scientific medicine, the product of a union of religion with philosophy, had its origin in a remarkable conjunction of gifts and conditions among the Greeks in the sixth centuries".

Such opinions remind us of an assertion of Sir William

Jones³ "that there is no evidence that in any language of Asia
there exists one original treatise on medicine considered as science".

About a century has elapsed since the time of Sir William but we
see that the same misconception still prevails in the minds of

Albutt and Rolleston. System of Medicine, vol. I, p. 1.

Oslar and Mcrae's System of Medicine,

Discourse xi, Sir William Jone's Works, Vol. 1, p. 161,

the scholars. Macdonell1 gives us a succint account of the intellectual debt of Europe to the various branches of science and art of the Hindus but regrets that the genetic connection of Indian medicine with that of Greece can not at present be definitely settled. "The question as to whether Indian medical science in its earlier period was affected by that of the Greeks can not be answered with certainty, the two systems not having hitherto been compared with sufficient care." The European mind is quite naturally in the habit of tracing all knowledge to Greece, the fountain of all their knowledge in philosophy and science. But impartial writers are not wanting to vindicate the claims of the Hindus. So Wise remarks as follows 2:-"Facts regarding the ancient history of medicine have been sought for only in the classical authors of Greece and Rome and have been arranged to suit a traditional theory which repudiated all systems which did not proceed from a Greecian source. We are familiar from our youth with classical history and love to recall events illustrated by the torch of genius and depicted on our memories; and it requires a thorough examination of a subject, a careful weighing of new evidence, and a degree of ingenuousness not always to be found to alter early impressions. Still candour and truth require us to examine the value of new facts in history as they are discovered, so as to arrive at just conclusions". Royle maintains3 that "from the mixture, however, of much ignorance and absurdity with what is valuable, many will be apt to despise altogether the medicine of the East. But if it be recollected how long in Europe prevailed the influence of Galen.

History of Sanskrit Literature, ch. xvi.

^{*} Review of the History of Medicine. Introduction,

Antiquity of Hindu Medicine, p. 61.

as well as how many absurd formulas still figure in some continental pharmacopœas, as also how comparatively recent is the time since our own was so greatly improved; some feeling of humiliation will control the pride with which we now view the medical sciences". Neuberger says1; "The medicine of the Indians, if it does not equal the best achievements of their race, at least nearly approaches them, and owing to its wealth of knowledge, depth of speculation and systematic construction, takes an outstanding position in the history of oriental medicine." It is no doubt unsatisfactory to find that such notions are still allowed to stand in the way of impartial conclusions by eminent men of science especially by those who write history of medicine. But it is not the fault of the historians alone, the fault lies with us for not having supplied them with adequate materials. Something has been done in this field of research by men like Wilson, Heyne, Ainsle, Royle, Dutt, Thacore Shaheb, Jolley, Hoernle and others, but it is nothing when compared to what is required to be done, To supply this want partially, we have endeavoured in this monograph to describe the surgical instruments of the Hindus, with a comparative study of the instruments of the Greek, Roman and Arab surgeons, and of the surgeons in modern times. By a careful study of this subject, we can not avoid the conclusion that the medicine of India though it was not Greek, contained the requirements of science and has a fair claim to be considered in the history of medicine. To it western medicine really owes something and so the subject has been studied and investigated thoroughly.

Neuberger, History of Medicine, Trans. by Playfair, Vol. I. p. 437.

Apart from the usefulness of the study for collecting materials for the history of medicine, there are good reasons for a critical examination of the subject. The knowledge of the Hindus in medical science was by no means rudimentary. There is evidence to show that they were inferior to none in the quality or quantity of the knowledge of the science at that early age. Hoernle says:1 "Its extent and accuracy are surprising when we allow for their early age-probably the sixth century before Christ-and their peculiar methods of definition." They practised dissection of human bodies and their anatomical studies have the mark of high order. "We have seen that they used various forms of surgical instruments. The Hindus cut for stone couched for the cataract and extracted the foctus from the womb". They performed abdominal section, practised cranial surgery successfully and no region of the body was thought sacred to the knife. They repaired nose and ears by plastic operations, treated fractures and reduced dislocations, and were experts in performing amputations. They reduced hernia, cured piles and fistula-in-ano by surgical technique, and inoculated and vaccinated for small-pox. Field surgery was thoroughly understood and arrows were extracted with skill. They were acquainted with the circulation of the blood,2

Decker.

Suśruta Samhitä, III. vii.

देशसीव्यक्तिरसजी देशसेनेव धाव्यते। रक्षं जीवस धाधारससाद्रचेदसम्बुधः॥

Hoernle's Osteology, Preface, P. iii.

ग्राभिरिदं गरीरमाराम इव जलहारियोभि: केदार इव च ज्ल्याभिरपिस्याते-इनुस्यातिवाक्त्र्यन प्रसारणादिमिर्व्विभिषे:। दुमप्रवसेवनीनामिव च तास्रो प्रतानासास्रो नामिर्मलं तत्रय प्रसरन्यवेमधिस्याव्यं च ।

the distinction between the artery and vein, the use of anaesthetics, the means of arresting hæmorrhage and the proper treatment of surgical wounds. They enumerated 107 vital parts of the body to be avoided, if possible, by the surgeon in practising his handicraft.

In medicine they first propounded the humoural pathology. Though it seems fanciful in the light of modern culture, it must be admitted that no other theory has been attempted to explain the causation of disease in recent times. "They were the first nation who employed minerals internally and to them we owe the therapeutic use of mercury and arsenic in intermittents". They introduced massage, postural treatment and magnet in therapeutics. They excelled in chemistry and contrived many instruments for the preparation of chemical compounds. Atomic theory was discovered by Kaṇāda; and "they knew how to prepare sulphuric acid, nitric acid and muriatic acid, the oxide of copper, iron, lead (of which they had both the red oxide and litharge),

विसता द्रवता रागयलनं विलयसया।
भूत्यादिपश्चभूतानानिते रत्ने गुणाः कृताः॥
रत्ने दुटे भविच्छीयो रत्नमण्डलनेव च।
व्यवा दाश्य पाक्य कच्छूच पीडकोद्गमः।
असे रत्नाङ नेवलं शिराणां पूर्णता तथा।
गावाणां गौरवं निद्रा मेश्री दाश्य जायते॥

Särngadharā Samgraha, III. xii. Bhāva Prakāša, I. ii.

इन्द्रगीपप्रभं चेयं प्रकृतिस्वसमंहतम्।

Sarngadhara Samgraha, III. xii.

गृदा: समस्त्रिता: सिन्धा रोहिन्य: ग्रंडगोषितम्।

Aştānga Hrdaya Samhitā, II. iii.

। स्प्रीत्तरं सर्वयतं।

Sufruta Samhitā, III.vica

tin, and zine; the sulphuret of iron, copper, mercury, antimony and arsenie; the sulphate of copper, zine and iron; and carbonates of lead and iron. The processes of solution, calcination and distillation were discovered by them.

They understood the action of drugs and no less than 500 classes of medicinal agents are enumerated and arranged according to their virtues in curing diseases, and their remedial agents have been collected from the vegetable, animal and mineral kingdoms. There are 41 different forms in which the medicaments may be exhibited to the patient. We have the earliest notice respecting zoology and botanical geography in their works. They had a complete nomenclature of diseases which are described minutely as regards their ætiology, symptomatalogy, diagnosis, pathology, prognosis and treatment.

Veterinary science was well known to them, and treatises on horses and elephants—Aśvavaidyaka and Pālakāpya² are still extant, and will repay perusal. Even there is a treatise on the treatment of plants and trees³. Thus we see that the Hindu medical science must not be condemned offhand and requires a careful and sympathetic research by scholars, before it can be excluded from the history of the science.

But I must be careful not to allow my enthusiast admiration carry me too far. It is quite true that the Ayurvedic system has its faults. It has been remarked that "it consisted of erroneous

Elphinistone's History of India, 8th ed. p, 160.

^{*} Another book on the medicine of elephants is quoted by Alberuni. See Sachau's Preface to Indica, p. xl.

^{*} For the bibliography of the Ayurvedic books, see my work "Materials, Biographical and Bibliographical, for the History of Hindu Medicine". (In the press).

doctrines founded upon a most fanciful anatomy, physiology and pathology. Much indeed could hardly be expected of a science based upon an anatomy which taught that the navel "constituted a centre from which a vascular system, including 40 principal vessels originated; upon a physiology which declared that these vessels were destined to convey blood, air, bile and phlegm to all parts of the body, and upon a pathology which maintained that disease depended either upon derangements of one or more of these humours or "upon the influence of good or evil spirits". It must however be remembered that this criticism refers to a theory elaborated some 3000 years before. The idea that the navel formed the centre of the vascular system apparently had its origin in the fœtal circulation. The position of the heart was well-known and its function as a profeelling organ is

यावत्यस्तु सिराः काये सम्भवन्ति शरीरिकाः ।
नाभां सन्त्रां निवडासाः प्रतन्त्रन्ति समन्ततः ॥
नाभिस्थाः प्राविनां प्राचाः प्राचान्नाभिवृंपात्रिता ।
सिराभिरावता नाभियक्रमाभिरिवारकैः ॥

तासी मूलिसरायलारिंगत्तासी वातवाहिन्यी दश पित्तवाहिन्यी दश कफवाहिन्यी दश दश रक्तवाहिन्य:।

Suŝruta Samhitā, III. vii.

तस्यान्तरेख नामेस्त ज्योतिःस्थानं भुवं खूतं। तदा धमति वातस्त देशसेनास्य वर्वते॥

Ibid, III, iv.

- A course of lectures on the Principles and Practice of Medicine delivered at Calcutta Medical College, By Francis, 1868,
- भातुम्तु खलु रसवहायो नाच्यो गर्भनाभिनाङ्गी प्रतिवडा सास्य मातुराहाररस-बौद्धमभिवहति । तेनोपखेडेनास्याभिङ्गिडभैवति ।

described in the ancient books1. In the later Tantras the origin of the nerves from the spinal cord and the brain is distinctly stated2. The ancient Hindus, like the Babylonians, thought the heart to be the seat of the understanding, and the liver as the central organ of the blood. The Greeks were the most cultured nation at that age, and the knowledge of the two nations can be compared to our advantage. The Hindus did not share with the Greeks the belief that the uterus is "an animal within an animal" and that it can be attracted by pleasant smells and repelled by pungent substances"3. The humoural pathology was also the keystone of the Greecian system. The belief in the good and evil spirit was the only alternative to the pathologists when the microscope and the germ theory of diseases were unknown. It is highly creditable to the classical Greek physicians for banishing superstition from the practice of the art; but we know that the later Greek writers Aetius, Alexander and Paulus, and the Latin medical literature, were not free from its baneful influence. The belief in charms and miracles in the cure of diseases seems to be universal and is

[े] स रसः दशुच्यते । तस्य च हदर्य स्थानं स हदयाचतुर्व्विणतीः धमनीरनुप्रविक्यीवैगा दश दश चाधीगामिन्यतस्रक्षित्यंगाः कृत्सं गरीरमहरहस्तपैयति ववैययि धारयति यापयति जीवयति चाहष्टसेतुकेन कर्माणा ।

Snáruta Samhita, I. xiv.

व द तिर्ध्यक्गते नाची पतुर्व्वित्रति संख्या।
 मैसदस्वेस्थिताः सर्वे स्वे मियगणात्व॥

जत्ममूलमधः शासं अचाकारं कलिवरं। ययाचत्यदले तहत् मरीरे नाड्यस्थिताः ॥

Tantra.

working even at the present time. Adams says¹ that "considering the faith which many educated persons now repose in the virtues of galvanic rings and garters, the present generation has little ground for laughing at the credulity of our forefathers, with respect to amulets and other phylacteries".

In later times, attempts have been made to substitute other theories in the place of the humoural, and we know with what results. "Paracelsus substituted an equally baseless hypothesis, that the fundamental element of the human body were three principles : sal, the solid element; quicksilver, the liquid; and sulphur, the aerial. This formula was the badge of the Paracelsist school up to the end of the 17th century." Sylvius and Willi (17th century) of the Iatro-chemical school "referred most diseases to morbid matters or "acrimonies" produced by perverted secretions, and these being sometimes too alkaline. sometimes too acid, the antithesis of acid and alkali became the badge or catch word" of their system. Friedrich Hoffman (1660-1742) constructed another system which "supposed life to be a universally diffused ether, which entering the animal body, became transformed in the brain into Pneuma or nervous fluid. "George Ernest Stahl (1660-1734) believed in the hypothesis of Animism, and "the symptoms of disease were regarded as the conscious efforts of the soul to overcome the morbid influences". William Cullen (1712-90) "propounded a new system of medicine, intended to reconcile the opposing views of his predecessors. Its main feature was the importance attached to the nervous system in the causation of disease." Lastly the "Brunonian" system of John Brown, based on

Adam's Commentary on Paul.

the doctrine of stimulus, and Hahneman's theory of homocopathy need be mentioned here to complete the list. Thus we see that even some of the eminent men of science indulged in fanciful theories in quite modern times.

The study of ancient Hindu medicine has an antiquarian value. It is perhaps the oldest system of medical science still extant. Fragments of Egyptian and Assyrian medicine have no doubt been unearthed. But these cannot be compared with the complete system of the medical science as preserved in the early Sanskrit works on the subject. The Hindus believe their science of medicine to be of divine origin and this belief is founded upon the fact that the existence of the medical profession can be traced back to prehistoric times. The humoural theory is mentioned in the Reveda2 which according to the consensus of opinions amongst the European savants can not be later than 2000 B.C., and possibly earlier. The Buddhists relate a story, how, in one of his former births. Buddha was born as a medicine-man. Mahosadha birth the archangel Sakka came to him as he was being born, and placing some fine sandal-wood in his hand, went away. He came out from the womb holding this in his fist. His mother asked him "What is it you hold, dear, as you come?" He answered "Medicine, mother!" So because he came holding medicine, they gave him the name of medicine-child (oṣadhadhāraka). Taking the medicine they kept it in a chatty (an earthenware water-pot) and it became

¹ Medicine in modern Europe. Payne in Albutt's System of Medicine, vol. 1, p. 26, 29, 34.

श्रीमानं श्रंबीर्भमकाय मृनदे तिथातु शर्म वहतं ग्रभस्यती ॥

a drug by which all the sickness of the blind and deaf and others as many as came, was healed—so the saying sprang up, "This is a powerful drug"; and hence he was called Mahosadha (The great medicine-man).¹ This early date of the science amongst the Hindus is not exceptional. It is now well-known that so severe an operation as trephining the skull was often performed in the early stone age. "Trephined skulls from neolithic period have been found in most European countries, in Algiers, the Canaries, North America, Mexico, Peru and the Argentine". In the Code of Hammurabi, king of Babylon (2285-2242 B. C.), there are thirteen articles regulating medical practice. One deals with the responsibilities of a surgeon performing operations on the eye. The laws Hammurabi lay down that:—

"If a Physician cause a severe operation wound with a bronze operating knife and cure the patient, or if he open a tumour (cavity) with a bronze operating knife and save his eye, he shall have ten shekels of silver.

"If it be a freedman, he shall have five shekels.

"If it be any one's slave, his owner shall give the pt ysician two shekels of silver.

"If the physician make a severe wound with a bronze operating knife and the patient die, or if he open a growth with a bronze operating knife and the patient lose his eye, he shall have his hands cut off.

"If a physician make a severe wound on the person of

Rhys David's Buddhist Birth Stories, vol. I, p. 67-68.

Neuberger's History of Medicine, P. 3.

a slave belonging to a freed man with the bronze operating knife and kill him, he shall replace the slave by another slave.

"If a physician heal a broken bone or cure diseased bowels, the patient shall pay the physian five shekels of silver."

Homer pays tribute to Egypt for her

" Patron-god imparts

To all the Pharian race his healing arts."

Herodotus says that the Egyptian physicians were specialists of particular diseases, and Clement of Alexandria mentions fortytwo Hermetic books on medicine by the god Thot.

"According to Manetho, he (Teta) constructed the Royal castle of Memphis and wrote a work on anatomy? being particularly occupied with medicine. The latter supposition is rendered more complete to a certain extent by the account, due to Ebers Papyrus³, that the method of making the hair grow, described accurately therein, was supposed to have been discovered by our king's mother, Shesh." Teta was the second king of the first dynasty of the old Memphis kingdom and flourished in 4366 B. C. King Senta of the second dynasty owned a medical work which belonged to Semti or Hesepti (4266 B. C.), the 5th king of the first dynasty. "Tosorthros of the third dynasty, was said to have composed a treatise on medicine, a fact which

Neuberger. History of Medicine, P. 18.

^{*} Manetho, in Müller-Didot, Fragmenta Historicum Grzec, vol. II, pp. 539, 540.

Ebers Papyrus, Pl. lxvi, 1, 5.

Historian's History of the World, vol. I, Egypt and Mesopotamia. p. 91.

^{*} Ibid, p. 68.

Manetho, etc., vol. II, p. 844.

caused him to be identified with the healing god Imhotpû."1 These facts suggest a great age for Egyptian medicine, Medicine flourished among the Assyrians: "Fragments of an old work on medicine have been found, which show that all known diseases have been classified and their symptoms described; and the medical mixtures considered appropriate to each being compounded and prescribed quite in modern fashion."2

The oldest medical treatise extant amogst the Chinese is the Neiching, the authorship being attributed to Hwang-ti; it dates back to B. C. 2597. Mr. Gatzlaff,3 missionary in China, has given us a short view of a celebrated work, in 40 volumes, on Chinese medicines, which is called Ching che chun ching i. e., "Approved marking line of medical practice"4 So the Hippoeratic treatises (460 B. C.) are rather modern compilations .compared to these ancient Looks; and as told by Plato, the priest of Sais was fully justified when he addressed to Solon: "You Greeks, you are but children."5

It will be seen again that a comparative study of the science discloses remakable affinity to the systems of the other contemporary nations. The fabulous origin of medicine in India and Greece can not fail to attract the notice of even a casual observer. The resemblance of Dakşa, the preceptor of the two Asvins, the offspring of Sun, who after learning the

Ibid, p. 544 and 545.

Quoted in Maspero's "The Dawn of Civilization." Edited by Prof. Savce. 5th ed. p. 238.

Assyria; its Princes, Priests and Peoples, Sayce, p. 119.

^{*} Proceedings of the Asiatic Society, Part VII, p. 154.

^{*} Royle: Antiquity of Hindu Medicine, p. 67. ere by the trace of the state of

Timetus, p. 22.

Avurveda from their father became the medical attendants of the gods, to Æsculapius-the reputed son of Apollo, and his two sons Machaon and Podalarius, celebrated in the Homeric poems, is indeed remarkable. More remarkable is the belief in humoural pathology shared by the two nations, separated from each other by continents and seas, and alienated from each other by the differences in customs, manners and religion. The theory of independent origin and development falls to the ground, especially when we consider the strange coincidence in the surgical instruments used by the two nations in performing surgical operations. Some of the instruments used by the Hindus were not only identical in structure and shape to the instruments of the Greeks, but they had even the same name. Thus for instance, the alabu yantra of the Hindus corresponds to the description of the cucurbitula of the Greeks, and both the terms mean a gourd. A śrnga is the horn; anguli yantra or mudrikā is the finger or ring-knife; voni-vranek-ana is the diopter or vaginal speculum; ankuśa is the hook; &c. Some instruments though they have different names are identical in structure and uses. Thus, the Scammum Hippocraticum or the Plinthium Nelei is the Greek counterpart of the Hindu kapātaśayana; the lithotomy binding of the vantrasatakam; the clyster of the vastiyantra; the saw of the karapatra; the needle of the sūcī; &c. Again many surgical operations are similarly described in both the systems, as for examples, the operations for stone and cataract may be cited. In the description of diseases, passages occur in books which seem to be a literal translation of one from the other. Thus in describing the symptoms of hydrophohia, Paulus quotes Rufus who pronounces it to be a species of melancholy and then observes "Which reason accords also with those who say that they think they saw the image of the dog that bit them in water". The word "those" in the above sentence becomes clear to us when we read a similar passage in the kalpasthana of the Suśruta Samhita, and it may be thus translated: "If the patient sees the image of the animal that bit him in the water or mirror, be is sure to die." Other passages might be multiplied but our limited space forbids any further quotations. All these coincidences can scarcely be accidental; and though we may not be able to trace the actual progress of medicine from India to Greece, yet the evidence in favour of its transmission is too strong to be held in doubt.

Thus the question of the relation of the medical science of the Hindus to that of the Greeks naturally suggests itself for solution. The possibility of a dependence of the either on the other can not be dismissed offhand for we have historical evidence of communication between the two nations at a very early age. We need not dwell at length upon those shoals and quagmires of historical controversies, the alleged conquest of India by Egyptian Scostris as recorded by Diodorus Seculus² in prehistoric times; the connection of the Phænician traders as proved by the articles of merchandise,—cinnamon, aloes, onyx, agate, ebony, tin and ivory³ diamond, gold and

Suśrutā Sāmhitā, V. vi.

भ अप्तुवा यदिवादमें रिष्टं तस्य विनिर्द्धित्॥ वस्त्रवस्थाद योऽभीकां अलाह्यापि वा जलं। जलवासन्विद्यातं रिष्टं तमापिकीर्तितं॥

^{*} I. ib. I. ch. 43. Nolan.

Strabo. xv 37. [Quotes Megasthenes; Theophrastus quoted by MacCrindle in Ancient India as described by classical authors, p. 46; Virgil. Georg. 11, 116-17 ("India alone preduces black ebony"), Georg. 1, 57. ("India sends Ivory"), Lonsdale and Lee's trans.; Horace, odes 1, 31.

embroidered work1 the commercial enterprises of the ships of Solomon (992 B. C.) from Ezion-Gaber² under the guidance of the mariners of Hiram (B.C. 980-917) which brought back the gold of "ophir," its almug trees and ivory, apes and peacocks; the possibility of an Indo-Hellenic intercourse to explain the remarkable coincidences between the systems of philosophy current amongst the two nations, and which culminated in the bold theory of Pococke3 that Pythagoras, who is generally considered to be the founder of the healing art amongst the Greeks4 was an adaptation of the Buddhugurus, and the assertion that Greece must have been an Indian colony before. Let us rather tread on firmer grounds and we know that two Greek physicians, Ktesias (about 400 B.C.) and Megasthenes (300 B. C.) visited Northern India. Ktesias in his Indica mentions the cochineal plant, its worm and dves, monkeys, elephant and parrot. He says that the Indians were free from headache, toothache or ophthalmia and from mouth sores or ulcers. Alexander the Great (B.C.327), so says Nearchus, employed some Hindu vaids in his camp in India to consult them in cases of snake-bites and other dangerous ailments. Megasthenes mentions ebony as growing in Bengal, and tiger. monkey and elephants are also alluded to. Strabbo mentions that Daimacus was sent to the court of Candragupta's son. but unfortunately the book he wrote about India is lost to us. Mention also should be made of the intercourse of Egypt with India under the Ptolemies and we know, that Ptolemy

Birdwood's Industrial Arts of India, pp. 263-4.

^{-- *} I. King. ix. 27; xii, p. 22.

India in Greece.

[.] See the Origin and Growth of the Healing Art-Bedroe 169.

Philadelphous sent an embassy headed by one Dionysos to the court of Pātaliputra. Another source of dessimination of Hindu learning over the Western world is the emigration of the Buddhist missionaries to the kingdoms of Ptolemies and Greek kings as proved by the edicts of Asoka. "And the Greek Simnoi (venerable) were no other than the Buddhist sramanas (these simnoi whom Clement of Alexandria has parrated to have rendered worship to a pyramid originally dedicated to the relics of a god, were the Buddhist Arbats (venerable) sramanas).1 The intercourse of the East and West after the Christian era is well known and will not supply us with any proof as to the indebtedness of the Greeks and Hindus to each other; though "Dietz proves that the late Greek physicians were acquainted with the medical works of the Hindus, and availed themselves of their medicaments"; but he more particularity shows that the Arabians were familiar with them, and extolled the healing art as practised by the Indians, quite as much as that in use among the Greeks.2

But what is more important to us as a proof of the influence of the Indian medical science upon the Greecian system is the identification of drugs of Indian origin in the meteria medica of the Greeks. For instance the Sacred Bean of Pythagoras has been identified with Utpalam or Indian Nelumbium.³ Hippocrates the Great, who was contemporary and kinsman of Ktesias⁴ the court physician to the king of Persia, mentions:—Sesamum Indicum (Tila); Nardostachys Jatamansi

¹ Lalitvistaram. Mitter's ed. ch. 1.

Journal of Education, Vol. viii, p. 176.

Pratt's Flowering Plants, Vol. 1, p. 67.

^{*} Galen ; Comment, in libr. de artic. iii.

(Jațămāihsī); Beswillia Thurifera (Kunduru); Zinziber Officinale (Śrńgavera); and Piper Nigrum (Marīci). Dioscorides (1st century A.D.) in his Materia Medica describes :- Agallochum, Bdellium, Ebony (Diosphynos Ebenaster), Ammomum zinziberis (Ginger), Calamus aromatious (sweet cane of Scripture), Eletteria Cardamomum (Elaci), Lycium Indicum or Russot, the product of Berbera lycium, Atramentum (Indigo), Onyx or the operculum of an Indian shell-fish, etc. In later times, we find Actius, an Alexandrian writer of the 5th century describing Indian nuts, sandal wood, cocoanuts, etc. Symon Set mentions camphor; and Paulus Aegineta (7th century A.D.), a writer well known for his judicious condensation of the Greek medical literature, mentions Aloes, Cantharides (Mylabris Cichory), Cloves (Caryophyllum Aromaticus), Millet (Panicium Halicum), Costos (root of Auklandia Costos), Cassia (Cinnamomum Cassia), Indian stones as amulets, Malabathri or tejpāt (Laurus Cassia), Ambar, etc.

Now let us reproduce some of the conclusions arrived at by Western scholars as the result of the controversy. As regards philosophy, Colebrooke¹ asserts that "the Hindus were teachers and not learners". Cunningham² says: "Indians have the advantage in point of time; and I feel satisfied that the Greeks borrowed much of their philosophy from the East" Weber³ remarks that "there is no ground whatever to suppose that Susruta borrowed his system of medicine from the Greeks, on the contrary there is much to tell against such an idea".

² Transactions of the Royal Asiatic Society, vol. I.

² Bhilsa Topes, pp. 32-33.

^{*} History of Indian Literature,

Prof. Diaz of the Konnigsberg University, detects the principles of Indian medicine in the medical literature of the Greeks". "It is to the Hindus" says Wise, "we owe the first system of medicine." Royle has proved beyond doubt the indebtedness of the Greeks and Arabs to the Hindus. Haas's theory that Susruta is the Indian adaptation of the Arabic name of Sugrat or Bugrat, the Arabic corruption of the Greek Hippocrates, and that Kasi is an adaptation of the Island of Cos has been deservedly condemned as "an elaborate joke". Neuberger says: 1-"The similarity between Indian and Greek medicine of the period is in its outline and in certain details so striking that it is hardly surprising that the originality of the former has frequently been questioned or even denied. The more so is this true since the dates of the more important Indian works are fixed with the greatest difficulty, and before the discovery of the most recent manuscripts they were quite indefinite.

In consideration of the outstanding independent achievements of the Indians in most branches of science and art, and of their aversion from foreign influences, the trend of opinion to-day, informed by recent discoveries is in favour of the originality of Indian medicine in its most salient features."

Another fact must here be pointed out that the Hindus always acknowledged any help they might have received from other nations for the development of their science. The striking proof of this is found with reference to the science of astronomy—the only branch of learning which seems to have been influenced by the Greeks. Varāhamihira compiled his famous Pañca-sidhāntica or the collection of the five old treatises on astronomy,

¹ Neuberger. History of medicine, Vol. I, p. 45.

viz., Paulisa, Romaka, Vasistha, Saura, and Paitamoha. Both Weber and Kern have no doubt that Paulisa was a Greek and the name Romaka speaks for itself. But in the Hindu medical literature there is no mention of any foreign help, and the Indian medical treatises do not contain a single technical term which points to a foreign origin. It is interesting to quote the well known passage of Garga: "The Yavanas (Greeks) are Mlecchas, but amongst them the science (astrology) is well established. Therefore they are honoured as Rsis-how much more than an astrologer who is a Brāhman". It is a standing monument of the catholic spirit of the Hindus, and they know no better way to show their respect for the learned men of the world. To this may well be contrasted the behaviour of the Greeks towards the other nations. The doctrines of Pythagoras are pre-eminently Indian 1, but that philosopher has not a word to speak of the Hindus. In astronomy the Greeks are indebted to Babylon: Ptolemy mentions that Hipparchus worked out and improved upon the astronomical computations of the Babylonians with reference to the moon; but recent discoveries from the clay tablets have shown that the figures ascribed to Hipparchus are merely copied from the numerical values worked out in Babylon. "The discovery of the precession of the equinoxes is generally ascribed to Hipparchus. It was he indeed, who brought this fact to the Greeks, and he estimated its yearly amount as from 36 to 39 seconds, but it is certain that he learned about it in Chaldea, and that he obtained the elements of his calculations from the astronomical observations made on the lower Euphrates".2 Paulus Aegineta

² See Enfield's History of Philosophy.

Historian's History of the World. Vol, I, p. 596.

gives us a complete system of operative surgery of the ancients. Celsus, in the last two books of his work, has treated of the surgical operations with considerable accuracy; and though the former availed himself of the labours of the latter, Celsus is never mentioned as one of the sources of informations used by Paulus who appears to have been wholly unacquainted with his works; and Adams remarks "but when did a Greek writer ever acknowledge himself under obligation to a Roman"?

But are we to suppose that the Greeks wilfully concealed the names of the Indian physicians in their books? Surely not. The Greeks might not have known the real source of the informations which they probably received second-hand. There is historical evidence of an intercommunication between Greece and Persia from the time of Ktesias or the 4th century B. C. to the 6th century A. D. We also know of a tradition that the services of the Great Hippocrates—a kinsman of Ktesias, were required in the Persian court, but he declined the invitation. Again we know that books on ancient sciences of India were possibly made use of by the Persians in early times, and to this intercommunication may be due "the coincidences which have been observed between the science of the Greeks and that of the Hindus" (Royle).

As regards the indebtedness of the Persians to Sanskrit literature," we have positive testimony on the subject, as the Baron de Sacy, in his account of the well-known Sanskrit origin of the Fables of Pilpay, states that these were first translated in Pehlevi during the reign of the Persian king Nooshirwan, who ascended the throne in 531, and died in 579 and who is reported by historians to have encouraged learning, and to have induced Greecian philosophy at his court. The translation

were made by the physician Barzouyeh who had brought the original from India with other books, and who by more than one previous journey to that country, had acquired a knowledge of Sanskrit. He is stated particularly, to have made two journeys, one for the purpose of procuring medicaments and herbs, and the other for obtaining specimens of literature of the Hindus "1. "Previous even to this (A. D. 330), we hear of the Persian king Bahram visiting, in disguise, the court of Basdeo, sovereign of Canouge, to study the laws, religion and manners of the Hindus."

But whatever differences of opinion there may be as regards the relation of the Greeks to the Hindoos, there is no doubt that the medical science of the Arabs was materially influenced by Hindu medicine. For we know that the medical treatises of Caraka, Suśruta and Mādhava were translated into Arabic in the beginning of the 8th century A. D., and the names of • Scarae, Scirae or Xarae and Sarad occur in the Latin translations of Avicenna, Rhases, and Scrapion. Rāy dwells at length on the similaritry of description of leeches as written by Suśruta and Rhazes. The modern medical science of the West is principally based on the Greecian system as preserved in the books of the Arabian authors and so indirectly depends for some particulars at least upon the Indian system.

Sachau in his preface to Alberuni's India4 remarks as

Antiquity of Hindu Medicine, p. 168-69.

Ibid, p. 73.

Rhazes: 'De Emblico,' (Scarac Indianus), 'De Zinzibere, (Sarac) Serapion: 'De Myrobalanis' (Xarch Indus), 'De Emblicis et bellericis (Xarcha Indus); Avicenna: 'Sub Emblico' (Scirac Indum),

^{*} Alberuni's India, Preface, p. xxx-xxxi.

follows:-"What India has contributed reached Bagdad by two different roads. Part has come directly in translations from the Sanskrit, part has travelled through Iran, having originally been translated from Sanskrit (Pali? Prakrit?) into Persian, and further from Persian into Arabic. In this way, e.g. the fables of Kalila and Dimna have been communicated to the Arabs, and a book on medicine probably the famous Caraka, cf. Fibrist r. 303". The Arabs also translated "Indian works on snakes (sarpavidyā), on poison (visavidyā)......on the veterinary art1......But not only were the medical books translated into Arabic we have evidence that Indian doctors practised in foreign courts. Sachau continues: 2 "Another influx of Hindu learning took place under Harun (A. D. 786-808). The ministereal family Barmak, then at the zenith of their power, had come with the ruling dynasty from Balkh, where an ancestor of theirs had been an official in the Buddhistic temple Naubehar, i. e., nava vihāra—the new temple (or monastery). The name Barmak is said to be of Indian descent, meaning paramaka, i. e., the superior (abbot of the vihara?) cf. Kern, Geschichte des Buddhismus in Indien, ii. 445, 543. Of course, the Barmak family had been converted, but their contemporaries never thought much of their profession of Islam, nor regarded it as genuine. Induced probably by family traditions, they sent scholars to India, there to study medicine and pharmacology. Besides, they engaged Hindu scholars to come to Bagdad, made them the chief physicians of their hospitals, and ordered them to translate from Sanskrit

Alberuni's India, Preface, p. xxxiv.

² Ibid p. xxxii.

into Arabic, books on medicine, pharmacology, toxicology, philosophy, astrology, and other subjects. Still in later centuries, muslim scholars travelled for the same purpose as the emissaries of the Barmak, e. g., Almuwaffak, not long before Alberuni's time (Codex Vindobonensis, sive medici Abu Mansur liber, fundamentorum pharmacologie, Ed. Selignann, Vienna, 1859, pp. 6, 10, and 15, 9)."

"Harun-al-Rashid (786-809) had two Indians Manka and physicians at his court"1 Manka translated the classical work on medicine, Susruta (cf. Steinschneider, Wissenschaftliche Blätter, Vol. l, p. 79) and a treatise on poison, ascribed to Kânakya, from Sanskrit into Persian (see Prof. Flügel, in Zietschrift der D. M. G. xi. 148 and s. 325). A Hebrew treatise on poison, ascribed to the Indian Zanik (Kanakya) is mentioned by Steinschneider Wissenschaftliche Blätter, Vol. 1, p. 65). Alberuni mentions an Indian Kankab as astrologer of Harun-al-Rashid (Reinaud, memoire sur 1' Inde, p. 315). He is likewise mentioned as a physican. Another Indian physician of Harun-al-Rashid is called Mankba (Reinaud). In the year 1381, a work on veterinary medicine ascribed to Salotar was translated from Sanskrit by the order of Firroz Shaha after the capture of Nagorecote. A copy of it was preserved in the Royal Library of Lucknow2. Among the Hindu physicians of the time one (ابن دعن is mentioned i.e., the son of DHN, director of the hospital of the Barmaks in Bagdad. This may be Dhanya, or Dhanian chosen probably on account of its etymological relationship with the name Dhanyantarī the name

Prof. Dietz, quoted by Royle, p. 64.

Maxmaller's Science of Language, Vol. I, p. 166.

of the mythical physician of the gods in Manu's law book and the epics (cf. A Weber, Indische Lithuraturgeschichte, pp. 284, 287). A similar relation seems to exist between the names Kanka, that of a physician of the same period, and Kankayana, an authority on Indian medicine (Weber 1. c., pp. 287, note, and 284 note, 302). The name ,el, that of an author of a book on drinkables, may be identified with Atri, mentioned as a medical author by Weber, 1. c. p. 288."1

For informations on the Arabie translations of Sanskrit works, see Analecta Medica by Dietz; Wustendeld's Geschichte der Arab Aerzte; Cureton, "A collection of such passages relative to India as may occur in Arabic writers"; Wilson's note to the above in J. R. A. S. old series, vi, pp. 105-115. Puschmann, p. 162; and Bedræ, book iv. eh. 11. pp 286-299.

The Arabians added many durgs to the meteria medica of the Greeks and amongst them we find the following Indian drugs described :-

Dorodam 2

Diudar or Pinus Deodara	Devadaru-
Artemesia Indica	Nāgdamani.
Piper cubeba	Sugandha marica.
Cassia fistula	Suvarnakha.
Senna or Cassia obvata	Sonāmukhī.
Galangal or Alpina galangal, Roxb	Kulin-jana.
Ammomum grana paradisi.	
Macis	Mace.
Nux mosehata	Nutmeg.

Sachan, Ibid p. xxxii.

It is described by Avicenna under its Sanskrit name, where he says that deindar, "est ex genera ablel juniperus, que dicitur pinus Inda; et syr dindar est ejus lac" (Quoted by Royle).

Bdellium.	Guggula.
Tamarindus Indica	Tintidī.
Trifolia	Triphala.1
Myrobalani	Haritaki.
Turpeth or Convolvulus Turpethum	Trivit.
Sel or Aegle marmelos	Vilya.
Santalum rubrum	Candana.
Melia azadirachta	Nimba.
Tembul (Piper betel)	Tāmbūl.
Faufil (Arecha catechu)	Khadira.
Nux vomica	Vişamuşti.
Musa paradisiaca or plantain	Kadalī.
Moschos moschifera (from Thibet & Inc	lia)Mṛganābhi.
Dolichos lebleb.	
Orange or Citrus aurantium	Nāgaratiga.
Limon or citrus medica	Mātulunga.
Pearls and other precious stones such as	lapiz lazuli, Borax, &
Rhabarburnum or Indian Rhubarb, etc.	

We can trace the Arabic and Greek names of some of the medicuments to a Sanskrit source. Royle has discussed them at length, so we need give here only a synopsis of it:—

Triphalā (S)—Tryphalla (A)—Tryphalla (G)—Tryphala parva (modern).

Devadāru (S)—Deiudar(Avicenna)—Deedara (G)—Pinus deedaru.

Tvaka-kshira (S)-Tabosheer (A).

Tamālpatra (S)-Malatroon or Malabathrum (G).

Tejapatra(s), or tuj-Sadej (A).

Actuarius copies from Serapion and Mesue, the use of this medicine. The very name is Sanskrit, meaning the 3 myrobalans. Serapion refers to Karch indus or Charak, in his De Myrobalani (Royle, P. 27).

Tambula (S)-Tumbol (P)-Tumbol (A).

Pippali (S)—Pippul (H)—pilpil (P)—filfil (A)—(G)—piper (E).

Sriigavera (S)—Shimgveez (P)—Zinzabil (A)—Zingiber (E).

Aguru (S)—aggur (H)—Agila (M)—Pao-d'aglia (aquilia) (po)—Aod Hindee Agallochum (G).

Candana (S)—chundan (H)—Shandana (T)—Sundul (P)—Santal (E).

Kolinjana (S)-Galanga (G).

Vaca (S)-Wuz (A).

Davrusita (S)—Darcheeni (H)—Darsheeni (A).

Cacyn-nama (C)-Akimona (P)-Kaimanis (M)-Cinnamon.

Kuṣṭha (S)—Kooth (H)—Kust (A)—Koosrus (G)—
Koshta (Sy)

Abnus-Ebony (E).

Kubara (S)-pupal (P)-fufal (A).

Sajikā (S)—Sajiimattee, sajiloon, sajii (H)—Sajimen vitri (Geber)—Soza or soda (E).

Khar, khari (S)-Kali. (A).

Kussas, missy (India)-misy (A)-misy (G).

Tincana (borax)—Tinkar (P)—tincal (E).

Ambara (S)-Kharoba (A)-Amber, Ambegrise (E).

Kassis (tin)-Kassiteros (G).

Tuttha (S)—tootum or tutia (H)—tutia (P)—tatanagum (T)—tutenagun and tutty.

Manasilā (S)-Mansil (G).

Harital (S)-hartal.

Sarkarā (S)—sakkara (T)—sukkur (A)—Sugar (E).

Sandaracha (S) or sulphuret of arsenic-Zarnach (P & G).

Sphotaka (S)-phoska (B)-pocca (A. S.)-pocke (Ger).

Tintidi (S)—Tamar Hind (A)—Tamuarin (Fr)—Tamarinds (Italy & Sp.)—Tamarind (B)—Tamarindos India (L).

Masurikā (S)-Masern (Ger)-Measles (E).

Vrana (S)-verole (Fr)-variola (L).

Danga (Hindus)-Dandy-Dengue (Sp).

S-Sanskrit. A-Arabic. G-Greek. T-Tamil. P-Persian. M-Malayan. Po-Portuguese. Sy-Syriac. Ger-German. A. S.-Anglo-Saxon. H-Hindi. E-English. B-Bengali. Fr-French. L-Tatin. It-Italy. Sp-Spanish.

Not only is the influence of the Sanskrit medical works detected in the Persian, Hebrew, Arabic, Greek and Roman works on medicine, there is evidence that the Hindu system of medicine was also adopted by the Tibetans and the Chinese. In the January No. 37 of the J.A.S.B. 1835 Vol. IV, an analysis of a Thibetan work is given by Alexander Csoma de Koros. It is called "rgyud bzhi" (the tract in 4 parts). It is attributed to Sakhya. "In the time of Khrisrong Dehutsan (i.e. 8th or 9th century of the Christian era) a Tibetan interpreter Bairotsana (or Vairochana) having translated in Cashmere, with the assistance of physician-pandit (Davam Non-gah) presented it to the above mentioned Thibetan king." In a Note on Thibetan surgical instruments, Walsh says:1 "The present practice of surgery in Tibet is very simple, and, as already noted, consists chiefly of cupping, cauterizing, and bleeding. The Am-chhi informed me that the only instruments used are the cupping-bow (235 me-pun, or agar me-bum, both meaning 'fire vessel'), in which

¹ The Thibetan Anatomical System by E. H. C. Walsh in J. R. A. S. 1910, pp. 1244-45.

paper is lit and the bowl is placed while hot over the part to be blistered; the sucking-horn (agaz hjib-ru), by which cupping by vacuum is done; the cautery (gqwa lehags-me), the lancet (53 rtsa-u), for bleeding, and a golden lancet (TRE 253 gser kyi rtsa-u) for operating on the eye.

In the journal of the Buddhist Text Society of Calcutta for 1894 three Tibetan block prints are illustrated, which contain representations of a large number of surgical instruments, some of them of an elaborate nature, including specula, saws, eatheters, exploring needles, instruments for tapping hydrocele, and midwifery and other forceps. The block-prints were brought by Rai Saratelandra Das, Bahadur, from Lhasa, and a description of the figures was given by the late Lama Ses-rab MGya Mtsho, the Abbot of Ghoom Monastery, near Darjeeling, who was formerly physician to the late Tashi Lama, which were explained in a paper read by Dr. Saradaprasad Banerjee.

If the elaborate and various instruments shown in the blockprint were ever in general use they appear to have now ceased to be used."

In the J.R.A.S. April 1907, is mentioned "a Chinese text corresponding to a part of the Bower manuscript" by Watanbe. The identified portion of the MSS. consists of the six leaves which appear in plates XLIX-LIV (Hoernle's ed). The corresponding Chinese text is contained in six translations of which the following three, correspond completely to the MSS.

Journal of the Buddhist Text Society, Vol. II, Pt. III, Calcutta 1894.
P. III.

^{*} Ibid, pp. IX. X.

- 1. Mohamayuri vidya-rajui-translated by I'tsing 705 A.D.
- 2. " Amoghavajra 746 to 77J A.D.
- 3. , , , , Sanghapala 516 A.D.

Again many articles are common to the Hindus and Chinese materia medica; as many aromatics (nutmeg, cloves, cinnamon and pepper), musk, rhubarb etc. And this is not at all surprising for we have evidence "that there was constant intercourse between these countries even before the Christian era, by means of travellers and ambassadors; and that Buddhist priests in visiting China, took with them as presents classical Indian books. It is also worthy of note, in connexion with the chapter on this subject in Susruta, that in A.D. 648, the Emperor of China having sent an ambassador to India, this officer met with a doctor, who told him that he was 200 years old, and that he possessed the recipe of immortality, upon hearing which, a second embassy was despatched in search of the philosophical stone" (Royle).

Even the modern medical science of Europe has been directly influenced by the Hindu system of medicine. In the materia medica used by the doctors in Europe now, we find the following curative agents—the produce of India. I quote here the list as prepared by Thakore Shaheb²:—

"Aconitum heterophyllum ... Ativisha.
Allium cepa ... Polandu.
Acacia catechu ... Khadira.

See Asiatic Journal, July 1836.

^{*} History of Aryan Medical Science, P. 128.

... Yayaza Alhagi maurorum Alstonia scholaris Saptaparna. Ela. Ammomum elettarum Habira. Andropogon nardus 1700 ... Katurina Andropogon schænanthus Agnidamani. Artemisia sternutatoria 220 Daruharidra. Berberis lycium ... Palagha Butea frondosa Sonamukhi Cassia lanceolata ... Indravaruni. Cucumis colocynthis Dhattura Dhatura alba, niger &c. ... Atarusha Justicia adhatoda... ... Katukoshtaki. Laffa amara Linum usitatissimum Atasi. Mallotus Philippiensis Kapillaka. 200 Katfala. Myrica sapida ... Ophelia chiretta and Ophelia Kirata. augustifolia Shatapushpa. Pimpinella Anisum ... Karanja. Pongamia glabra... ... Ajamoda. Ptychotis ajowan Eranda. Ricinus communis Undurkarnika Salvinia cucullata Santalum album & Santalum Chandana. 102 flavum Ajakarna. Shorea Robusta ... Strychnos potatorum, Strychnos Katakafala. nux vomica

Tinospora Cordifolia

... Guduci.

Valeriana Hardwicki ... Tagara.

Wrightia Antidysenterica ... Indrayava."

To this list may be added the following drugs from the Indian and Colonial Addendum to the British Pharmacopæa, 1898:—

Acacia Arabica ... Vāvvula.

Acalypha Indica ... Muktabarşi.

Andrographis Paniculata ... Kirāta.

Aristolochia Indica ... Arkamula.

Arachia Hypogaea ... Bucanaka.

Citrus Aurantium ... Nāgaranga.

Azadirachta Indica ... Nimba.

Aegle Marmelos ... Vilva.

Piperbetel Tāmbula.

Piperbetel

Cæsalpina Sappan..... Patanga or Bakam.

Calotropis Procera and

C. Gigantine ... Arka.

Gossypium Herbaceum ... Kārpāsa.

Cambogia Indica.

Cissampelos Pariera ... Ambashthai.

Coscinum Fenestratum ... Dāru-haridrā or darvi.

Gynocardia Odorata ... Chālmugra. Hygrophila Spinosa ... Kokilāk-a.

Anogeissus Latifolia

Embelia Ribes and E. Robusta... Vidanga.

Plantago Ovata ... Ispaghula.

Ipomiea Hederacea ... Kālādāna.

Ipomæa Turpethum ... Trivit.

Mylabris Phalerta.

Terminalia Chebula ... Haritakī.

Sesamum Indicum ... Tila.

Pierorhiza Kurroa ... Katuka,

Urginea Indica ... Vanapalāņdu.

As regards the medicines used by the Hindus, Neuberger says 1:

"The Pharmacopia, corresponding with the fruitful nature of the land was a rich one and stamps Indian medicine with a character entirely its own, whilst nothing speaks more eloquently for its originality than the fact that of all the many medicinal plants no single one was European."

Elphinstone wonders at the knowledge of simples in which the Hindus early gave lessons to Europe and "more recently taught us the benefit of smoking Datura in asthma and the use of cowitch against worms," and "the prescribing of Nux Vomica in paralysis and dyspepsia, and the revival of the use of Croton Tiglium" (Royle). In surgery, too, the modern surgeons of Europe have borrowed the Indian method of Rhinoplastic operation first made known to European surgeons by a letter which was printed in the Gentleman's Magazine for October 1794, p. 891. In fact Dr. Hirschberg of Berlin says that "the whole plastic surgery in Europe had taken its new flight when these cunning devices of Indian workmen became known to us. The transplanting of sensible skin flaps is also an entirely Indian method." The modern method of making pockets for the

Nenberger, History of Medicine, vol. 1, P. 54,

testicles under the Colles' fascia after the operation for scrotal tumour (elephantiasis) can be traced back to the age of Suśruta¹.

Thus we see that it can safely be affirmed that the medical science of Europe has been, both directly and indirectly, influenced by the Hindu System of Medicine.

पादी निरक्तमुष्कस्य जलीन प्रोत्य चाविको। प्रविध्य तुन्समेवन्या मुक्को सीब्येक्ततः परं॥

Susruta Samhitä, IV. ii.

THE END.

APPENDIX.

I'Tsing 1 says :-

"The following are the eight sections of medical science. The first treats of all kinds of sores; the second, of acupuncture for any disease above the neck; the third, of the diseases of the body; the fourth, of demoniac disease; the fifth, of the Agada medicine (i.e. antidote); the sixth, of the diseases of children; the seventh, of the means of lengthening one's life; the eighth, of the methods of invigorating the legs and body. 'Sores' (1) are of two kinds, inward and outward. The disease above the neck (2) is all that is on the head and face; any disease lower down from the throat is called a 'bodily' disease (3). The 'Demoniac' (4) is the attack of evil spirits, and the 'Agada' . (5, but 6 of Ayur-veda) is the medicine for counteracting poisons. By 'Children' (6, but 5 of Ayur-veda) is meant from the embrayo stage until after a boy's sixteenth year; 'lengthening life' (7) is to maintain the body so as to live long, while 'invigorating the legs and body' (8) means to keep the body and limbs strong and healthy. These eight arts formerly existed in eight books, but lately a man epitomized them and made them into one bundle. All physicians in the five parts of India practise according to this book, and any physician who is well versed in it never fails to live by the official pay. Therefore Indians greatly honour physicians and much esteem merchants, orf they do not injure life, and they give relief to others as well as benefit themselves. I made a successful study in medical

A Record of Buddhist Practices, Ch. XXVII, pp. 127-8.

science, but as it is not my proper vocation I have finally given it up."

Dr. Takakusu1 comments on the passage as follows:-

"The eight sections of Medicine which I-tsing describes are no doubt the eight divisions of the Åyur-veda. He mentions an epitomiser of these divisions, who seems to have been a famous physician and contemporary of I-tsing (or just before I-tsing). This epitomiser may be Susruta, who calls himself a disciple of Dhanvantari, one of the Nine Gems in the Court of Vikramâditya.

Prof. Wilson says in his Works, vol. iii, p. 274:-

'The Ayur-veda, which originally consisted of one hundred sections, of a thousand stanzas each, was adapted to the limited faculties and life of man, by its distribution into eight subdivisions, the enumeration of which conveys to us an accurate idea of the subject of the Ars Medendi amongst the Hindus.

The eight divisions are as follows :-

I. Sâlya (I-tsing's (1) cure of sores).

The art of extracting extraneous substances, grass, earth, bone, &c., accidentally introduced into the human body, and by analogy, the cure of all phlegmonoid tumours and abscesses. Salya means a dart or arrow.

II. Sálákya (I-tsing's (2) art of acupuncture).

The treatment of external organic affections or diseases of the eyes, ears, nose, &c. It is derived from Salaka, "a thin and sharp instrument," and is borrowed from the generic name of the slender probes and needles used in operation on the parts affected.

A Record of Budd's its Practices, Ch. XXVII, pp. 222-3.

The above two divisions constitute the surgery of modern schools.

III. Kâya-kikitsâ (I-tsing's (3) treatment of the diseases of the body).

The application of the Ars Medendi (Kikitså) to the body in General (Kâya). It forms what we mean by the science of medicine.

IV. Bhûta-vidyâ (I-tsing's (4) treatment of demoniac disease).

The restoration of the faculties from a disorganised state induced by demoniacal possession. The art vanished before the diffusion of knowledge, but it formed a very important branch of medical practice through all the schools, Greek, Arabic, or European.

V. Kaumara-bhritya (I-tsing's (6) treatment of the diseases of children).

The care of infancy, comprehending not only the management of children from their birth, but the treatment of irregular lactic secretion, and puerperal disorders in mothers and nurses.

VI. Agada (I-tsing's (5) Agada medicine).

The administration of antidotes—a subject which, as far as it rests upon scientific principles, is blended with our medicine and surgery.

VII. Râsâyana (I-tsing's (7) application of the means of lengthening one's life).

Chemistry, or more correctly alchemy as the chief end of the chemical combinations it describes, and which are mostly metallurgie, is the discovery of the universal medicine—the elixir that was to render health permanent, and life perpetual.

VIII. Vågikarana (I-tsing's (8) methods of invigorating the legs and body).

Promotion of the increase of the human race—an illusory research, which, as well as the preceding, is not without its parallel in ancient and modern times.'

Prof. Wilson further remarks:—'We have, therefore, included in these branches all the real and fanciful pursuits of physicians of every time and place. Susruta, however, confines his own work to the classes Sâlya and Sâlâkya or surgery; although, by an arrangement not uncommon with our own writers, he introduces occasionally the treatment of general diseases and the management of women and children when discussing those topics to which they bear relation.' (See Wilson's Works, vol. iii, p. 276.)"

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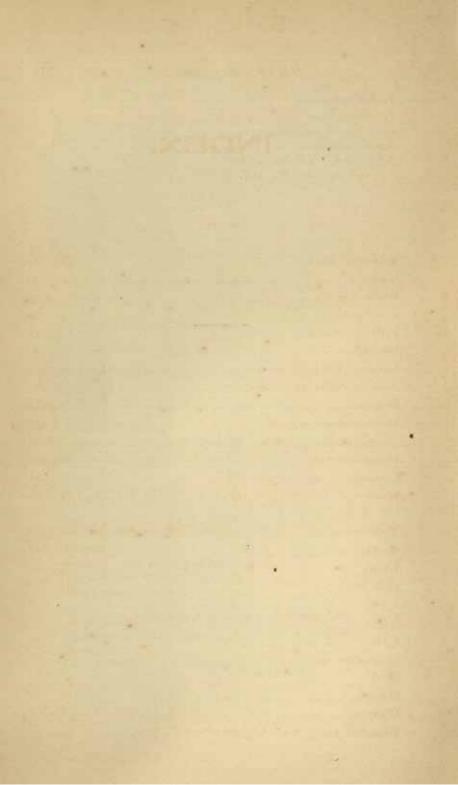
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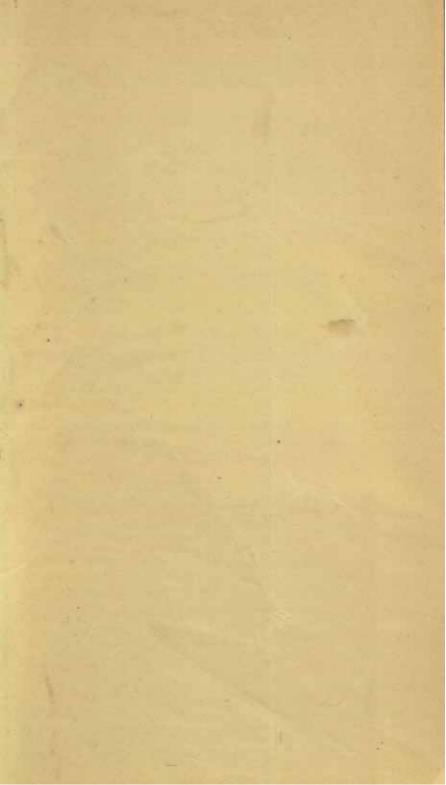
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